DRAFT

DETAILED PROJECT REPORT 1 (DPR-1) PRESTONSBURG AND LOWER LEVISA FORK

AND

ENVIRONMENTAL IMPACT STATEMENT (EIS) SECTION 202 FLOOD DAMAGE REDUCTION FLOYD COUNTY, KENTUCKY

APPENDIX X, GENERAL PLAN

APRIL 2006

U.S. ARMY CORPS OF ENGINEERS
Huntington District
Great Lakes and Ohio River Division
502 Eighth Street
Huntington, West Virginia

DRAFT
DETAILED PROJECT REPORT 1 (DPR-1) PRESTONSBURG AND LOWER LEVISA FORK and ENVIRONMENTAL IMPACT STATEMENT (EIS)
SECTION 202 FLOOD DAMAGE REDUCTION, FLOYD COUNTY, KENTUCKY

ORGANIZATION

This DRAFT Detailed Project Report DPR-1 and Environmental Impact Statement (EIS) addresses the proposed actions determined by the U.S. Army Corps of Engineers to be necessary to provide flood control and damage reduction within the Levisa Fork Basin in Floyd County, Kentucky. The Levisa Fork Basin (the land area, or watershed, drained by the Levisa Fork of Big Sandy River) was devastated in the April 1977 flood, causing an estimated $280 million (2004 price level) in damages. As a direct result of the losses from this flood, the Energy and Water Development Appropriations Act of 1981 (Public Law (PL) 96 367) provided authorization for development of flood protection measures for the Levisa and Tug Forks of the Big Sandy River. Section 202 of that authorization directed the Secretary of the Army, acting through the Chief of Engineers, to design and construct, at full Federal expense, flood damage reduction measures in those areas impacted by the flood. As required by the National Environmental Policy Act of 1969 (NEPA; 42 USC 4321 *et seq.*), the Council on Environmental Quality (CEQ) Regulations Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508), and Engineer Regulations (ER) 200-2-2 and ER 1105-2-100, the potential environmental, cultural and socioeconomic effects of the proposed actions and considered alternatives are analyzed. The DRAFT DPR-1/EIS is organized in the following fashion:

SUMMARY Briefly describes the proposed action, provides a summary of environmental, cultural, and socioeconomic consequences, and compares and contrasts potential effects associated with the four (4) considered alternatives.

CHAPTER 1.0 **STUDY INFORMATION** provides background information about the Section 202 Flood Damage Reduction program and its statutory authority. The chapter also presents the proposed project location, the scope of the study, prior projects under the General Plan, project sponsorship, and the decision to be made using this document.

CHAPTER 2.0 **PURPOSE AND NEED** summarizes the purpose of and need for taking action, provides relevant background information, describes the scope of the DPR-1/EIS, summarizes public participation for the EIS, and identifies related NEPA documentation.

CHAPTER 3.0 **STUDY OBJECTIVES** presents the national, NEPA, and planning objectives of this proposed project.

CHAPTER 4.0 **ALTERNATIVES** describes alternatives for implementing the Agency action and how they were developed.

CHAPTER 5.0 **AFFECTED ENVIRONMENT** describes the existing environmental, cultural, and socioeconomic setting of the proposed project area.

CHAPTER 6.0 **ENVIRONMENTAL CONSEQUENCES** identifies potential environmental, cultural, and socioeconomic effects of implementing the proposed actions and alternatives, identifies mitigation measures associated with each, and compares and contrasts potential effects from the alternatives.

CHAPTER 7.0 **PUBLIC INVOLVEMENT, REVIEW, AND CONSULTATION** includes a summary of the public involvement programs for this project, early coordination with regulatory agencies, coordination with the U.S. Fish and Wildlife Service, and a listing of agencies and individuals receiving this draft DPR-1/EIS.

CHAPTER 8.0 **PREPARERS** provides a list of persons who prepared the document and their areas of expertise.

CHAPTER 9.0 **REFERENCES and BIBLIOGRAPHY** provides bibliographical information for cited sources.

CHAPTER 10.0 **ACRONYMS and GLOSSARY** provides a list of acronyms used and definitions for terms used in the draft DPR-1/EIS.

CHAPTER 11.0 **INDEX** identifies page numbers for topics of potential interest to the reader.

FIGURES Figures for this document are provided under a separate tab.

ANNEXES

ANNEX A. **PUBLIC AND AGENCY INVOLVEMENT**
ANNEX B. **ECOLOGICAL SUMMARY REPORT**
ANNEX C. **404(b)(1) ANALYSIS**
ANNEX D. **COMMUNITY COHESION REPORT**
ANNEX E. **PHASE I HTRW ENVIRONMENTAL SITE ASSESSMENT REPORT**

CONTENTS

EXECUTIVE SUMMARY ES-1

CHAPTER 1. STUDY INFORMATION 1-1

1.1 Project Background 1-1
1.2 Purpose of the Report 1-1
1.3 Study Authority 1-2
1.4 Planning Process and Report Organization 1-3
1.4.1 Planning Process 1-3
1.4.2 Report Organization 1-4
1.5 Project Area Location and Phasing 1-5
1.5.1 Location 1-5
1.5.2 Project Phasing 1-5
1.6 Scope of the Study 1-6
1.6.1 Project Phasing 1-6
1.6.2 Connected, Cumulative and Similar Actions 1-6
1.7 Prior Reports and Existing Projects 1-7
1.7.1 General Plan 1-7
1.7.2 General Planning Memorandum 1-7
1.7.3 General Plan Supplement 1-8
1.7.4 Implementation Appendices 1-8
1.7.5 Levisa Fork Basin Projects Overview 1-10
1.7.5.1 Levisa Fork Basin Structural Projects 1-10
1.7.5.2 Levisa Fork Nonstructural Projects 1-11
1.8 Project Sponsorship 1-12
1.9 Decision to be Made 1-12

CHAPTER 2. PURPOSE AND NEED 2-1

2.1 Problems 2-1
2.2 Opportunities 2-4
2.3 Public Concerns 2-4
2.3.1 Scoping 2-4
2.3.2 Issues of Public Concern 2-5
2.4 Planning Constraints 2-6
2.4.1 Funding 2-6
2.4.2 Floodplain Regulations 2-6
2.4.3 Federal Statutes, Regulations, and Executive Orders (EOs) 2-7
2.4.4 Kentucky Environmental Statutes and Regulations 2-12

CHAPTER 3. STUDY OBJECTIVES 3-1

3.1 National Objectives 3-1
3.2 NEPA Objectives 3-1
3.3 Planning Objectives 3-2

CHAPTER 4. ALTERNATIVES 4-1

4.1 Plan Formulation Rationale 4-1
4.1.1 Specific Local Concerns 4-1
4.1.2 General Plan Alternatives 4-1

4.1.3 Level of Protection ... 4-1
4.1.4 Eligibility ... 4-1
4.1.5 Participation Rates ... 4-2
4.2 Potential Flood Damage Reduction Techniques ... 4-2
4.2.1 Nonstructural Measures ... 4-2
4.2.1.1 Voluntary Floodproofing ... 4-3
4.2.1.1.1 Floodproofing Techniques ... 4-3
4.2.1.1.2 Level of Protection ... 4-4
4.2.1.1.3 Floodproofing Eligibility ... 4-4
4.2.1.1.4 Conclusion ... 4-5
4.2.1.5 Permanent Floodplain Evacuation ... 4-5
4.2.1.5.1 Permanent Floodplain Evacuation Eligibility ... 4-6
4.2.1.5.2 Permanent Floodplain Evacuation Process ... 4-6
4.2.1.5.3 Conclusion ... 4-7
4.2.1.2 Flood Insurance and Floodplain Zoning ... 4-7
4.2.1.3 Flood Warning and Emergency Evacuation Plan ... 4-7
4.2.1.4 Financial Compensation ... 4-8
4.2.1.5 Protection of Government Owned Structures ... 4-8
4.2.2 Structural Techniques ... 4-9
4.2.2.1 Channel Modification ... 4-9
4.2.2.2 Reservoirs ... 4-11
4.2.2.3 Stream Cleanout and Rehabilitation ... 4-11
4.2.2.4 Floodwalls and Levees ... 4-11
4.2.3 Conclusions ... 4-13
4.2.3.1 Nonstructural Techniques ... 4-13
4.2.3.2 Structural Techniques ... 4-13
4.3 Development and Evaluation of Preliminary Floodwall Alternatives ... 4-14
4.3.1 Protection from 1977-level Event ... 4-14
4.3.2 Protection from Standard Project Flood ... 4-15
4.3.3 Long Floodwall Alignment Protecting Downtown Prestonsburg and Extending to Wastewater Treatment Plant ... 4-15
4.3.4 Long Floodwall Alignment Protecting Downtown Prestonsburg and Extending to the Big Sandy Community and Technical College ... 4-16
4.3.5 Long Floodwall Alignment Protecting Downtown Prestonsburg and Extending to the Blackbottom Area ... 4-18
4.3.6 Short Floodwall Alignment Protecting Downtown Prestonsburg ... 4-19
4.3.7 Short Floodwall Protecting Blackbottom Area ... 4-20
4.3.8 West Prestonsburg Floodwall ... 4-21
4.3.9 Lancer Area Floodwall ... 4-21
4.3.10 Conclusions ... 4-21
4.4 Final Array of Alternative Plans ... 4-23
4.4.1 Basis for Alternative Plans ... 4-23
4.4.2 Plan 1: No Federal Action ... 4-24
4.4.3 Plan 2: Long Floodwall Ending at Big Sandy Community and Technical College plus Nonstructural Program ... 4-25
4.4.4 Plan 3: Long Floodwall Ending at Blackbottom plus Nonstructural Program 4-25
4.4.5 Plan 4: Total Nonstructural Program (Measure 12) ... 4-26
4.5 Comparison of Alternatives ... 4-26
4.6 Preferred Plan ... 4-34
4.7 Implementation Requirements – Preferred Plan ... 4-35
4.7.1 Plan Components (Including Mitigation) ... 4-37

4.7.2 Local Betterments 4-41
4.7.3 Operations, Maintenance and Replacement Considerations 4-41
4.7.4 Fully Funded Cost Estimate 4-41
4.7.5 Cost Apportionment 4-41
4.7.6 Views of Non-Federal Sponsors and Any Other Agencies Having Implementation Responsibilities 4-42

CHAPTER 5. AFFECTED ENVIRONMENT 5-1

5.1 Geographic Setting 5-1
5.2 Climate 5-1
5.3 Land Use 5-2
5.3.1 Levisa Fork Basin 5-2
5.3.2 Floyd County 5-3
5.3.3 Local Zoning 5-4
5.3.4 Soil Borrow Areas 5-4
5.4 Visual and Aesthetic Resources 5-5
5.5 Topography, Geology and Soils 5-5
5.5.1 Topography 5-5
5.5.1.1 Region 5-5
5.5.1.2 Floyd County 5-6
5.5.2 Geology 5-7
5.5.2.1 Region 5-7
5.5.2.2 Floyd County 5-7
5.5.3 Soils 5-7
5.5.3.1 Floyd County 5-7
5.5.3.2 Prime Farmland and Hydric Soils 5-8
5.5.3.3 Prestonsburg Project Area 5-10
5.6 Air Quality 5-11
5.6.1 Regulatory Framework 5-11
5.6.1.1 Compliance with Federal/State Implementation Plans 5-13
5.6.1.2 General Conformity Rule 5-13
5.6.2 Existing Conditions 5-13
5.6.3 Proximate Sensitive Receptors 5-14
5.7 Noise 5-14
5.7.1 Regulatory Framework 5-14
5.7.2 Existing Conditions 5-17
5.8 Water Resources 5-18
5.8.1 Regulatory Framework 5-18
5.8.2 Surface Water and Floodplains 5-20
5.8.2.1 Levisa Fork Basin 5-20
5.8.2.2 Floyd County 5-21
5.8.2.3 Levisa Fork within Prestonsburg Structural Area 5-23
5.8.2.4 Levisa Fork Tributaries within Prestonsburg Structural Area 5-23
5.8.2.5 Soil Borrow Areas 5-24
5.8.3 Surface Water Quality 5-25
5.8.4 Wetlands 5-26
5.8.5 Groundwater 5-27
5.9 Ecological Resources 5-28
5.9.1 Regulatory Framework 5-28
5.9.2 Aquatic Resources 5-29
5.9.3 Terrestrial Resources 5-29

5.9.3.1 Vegetation 5-29
5.9.3.2 Wildlife 5-31
5.9.4 Special Status Species 5-31
5.10 Cultural Resources 5-34
5.10.1 Definition of Cultural Resources 5-34
5.10.2 Regulatory Framework 5-34
5.10.3 Significance Criteria 5-35
5.10.4 Prehistoric Cultural Context 5-35
5.10.4.1 Paleoindian Period, ca. 10000-8000 BC 5-36
5.10.4.2 Archaic Period, ca. 8000-1000 BC 5-37
5.10.4.3 Woodland Period, ca. 1000 BC-AD 1000 5-39
5.10.4.4 Late Prehistoric Period, ca. AD 900-1700 (Fort Ancient Culture) 5-41
5.10.4.5 Protohistoric Period, ca. AD 1540-1795 5-42
5.10.5 Historic Cultural/Historical Context 5-43
5.10.5.1 The Appalachian Region Cultural Context 5-43
5.10.5.2 Early Settlement in the Appalachian Region 5-43
5.10.5.3 Civil War Developments (1861-1865) 5-44
5.10.5.4 The “Discovery” of the Appalachian Region 5-45
5.10.5.5 The Discovery of Natural Resources 5-45
5.10.5.6 End of the Agrarian Economy 5-46
5.10.5.7 Immigration 5-46
5.10.6 Modern Appalachian Culture 5-46
5.10.7 Existing Conditions 5-47
5.10.7.1 Prehistoric Surveys and Sites 5-47
5.10.7.2 Historic Properties Investigations and Sites 5-52
5.11 Socioeconomic Resources and Environmental Justice 5-52
5.11.1 Population 5-52
5.11.2 Race and Ethnicity 5-56
5.11.3 Households 5-57
5.11.4 Housing 5-57
5.11.5 Education 5-59
5.11.6 Local Economy, Employment and Labor Force 5-60
5.11.7 Income and Earning 5-62
5.11.8 Community Services 5-63
5.11.9 Community Cohesion 5-63
5.12 Recreation 5-65
5.13 Hazardous, Toxic and Radioactive Waste 5-67
5.13.1 Regulatory Framework 5-67
5.13.2 Existing Conditions 5-67
5.14 Health and Safety 5-69
5.15 Infrastructure 5-70
5.15.1 Telecommunications 5-70
5.15.2 Electricity 5-70
5.15.3 Natural Gas 5-70
5.15.4 Water 5-70
5.15.5 Wastewater 5-72
5.15.6 Solid Waste 5-72
5.15.7 Transportation 5-73
5.15.7.1 Roadway 5-73
5.15.7.2 Rail 5-75
5.15.7.3 Airports 5-75

5.15.7.4 Public Transportation ... 5-75
5.15.7.5 Bicycle Trails ... 5-76
5.16 Future Without Conditions ... 5-76

CHAPTER 6. ENVIRONMENTAL CONSEQUENCES ... 6-1

6.1 General Overview ... 6-1
6.1.1 Direct Versus Indirect Impacts ... 6-1
6.1.2 Short-Term Versus Long-Term Impacts ... 6-1
6.1.3 Cumulative Impacts ... 6-1
6.1.4 Significance Criteria ... 6-2
6.1.5 Mitigation ... 6-2
6.2 Land Use ... 6-3
6.2.1 Impact Analysis Methodology ... 6-3
6.2.2 Significance Criteria ... 6-4
6.2.2.1 Incompatible Land Use Impacts ... 6-4
6.2.2.2 Plan Consistency Land Use Impacts ... 6-4
6.2.2.3 Inappropriate Commitment of Land Resources Impacts ... 6-4
6.2.3 No Federal Action (Alternative Plan 1) ... 6-5
6.2.4 Structural (Alternative Plans 2 and 3) ... 6-5
6.2.5 Nonstructural Alternative (Plan 4) ... 6-8
6.3 Visual and Aesthetic Resources ... 6-8
6.3.1 Significance Criteria ... 6-8
6.3.2 Methodology ... 6-9
6.3.3 No Federal Action (Alternative Plan 1) ... 6-9
6.3.4 Structural (Alternative Plans 2 and 3) ... 6-9
6.3.5 Nonstructural (Alternative Plan 4) ... 6-11
6.4 Topography, Geology, and Soils ... 6-12
6.4.1 Impact Analysis Methodology ... 6-12
6.4.2 Significance Criteria ... 6-12
6.4.3 No Federal Action (Alternative Plan 1) ... 6-14
6.4.4 Structural (Alternative Plans 2 and 3) ... 6-14
6.4.5 Nonstructural (Alternative Plan 4) ... 6-16
6.5 Air Quality ... 6-17
6.5.1 Impact Analysis Methodology ... 6-17
6.5.2 Significance Criteria ... 6-17
6.5.3 No Federal Action (Alternative Plan 1) ... 6-18
6.5.4 Structural (Alternative Plans 2 and 3) ... 6-18
6.5.5 Nonstructural (Alternative Plan 4) ... 6-20
6.6 Noise ... 6-20
6.6.1 Impact Analysis Methodology ... 6-20
6.6.2 Significance Criteria ... 6-21
6.6.3 No Federal Action (Alternative Plan 1) ... 6-21
6.6.4 Structural (Alternative Plans 2 and 3) ... 6-21
6.6.5 Nonstructural (Alternative Plan 4) ... 6-25
6.7 Water Resources ... 6-26
6.7.1 Impact Analysis Methodology ... 6-26
6.7.2 Significance Criteria ... 6-27
6.7.3 No Federal Action (Alternative Plan 1) ... 6-28
6.7.4 Structural (Alternative Plans 2 and 3) ... 6-28
6.7.4.1 Levisa Fork ... 6-28
6.7.4.2 Tributary Streams ... 6-34

6.7.5 Nonstructural (Alternative Plan 4) ... 6-37
6.8 Biological Resources ... 6-37
6.8.1 Impact Analysis Methodology ... 6-37
6.8.2 Significance Criteria ... 6-38
6.8.3 No Federal Action Alternative (Alternative Plan 1) ... 6-39
6.8.3.1 Aquatic Resources ... 6-39
6.8.3.2 Terrestrial Resources ... 6-40
6.8.3.3 Wildlife Resources ... 6-40
6.8.3.4 Threatened and Endangered Species ... 6-40
6.8.3.5 Wetlands ... 6-40
6.8.4 Structural Alternatives (Alternative Plans 2 and 3) ... 6-40
6.8.4.1 Aquatic Resources ... 6-40
6.8.4.2 Terrestrial Resources ... 6-43
6.8.4.3 Wildlife Resources ... 6-47
6.8.4.4 Threatened and Endangered Species ... 6-48
6.8.4.5 Wetlands ... 6-48
6.8.5 Nonstructural Alternative (Alternative Plan 4) ... 6-48
6.8.5.1 Aquatic Resources ... 6-49
6.8.5.2 Terrestrial Resources ... 6-49
6.8.5.3 Wildlife Resources ... 6-49
6.8.5.4 Threatened and Endangered Species ... 6-49
6.8.5.5 Wetlands ... 6-49
6.8.6 Ecological Mitigation Plan for Structural Alternatives ... 6-50
6.8.6.1 Aquatic Resources ... 6-50
6.8.6.2 Terrestrial Resources ... 6-51
6.8.6.3 Invasive Species Management Plan ... 6-52
6.8.6.4 Threatened and Endangered Species ... 6-54
6.8.6.5 Wetlands ... 6-54
6.9 Cultural Resources ... 6-54
6.9.1 Impact Analysis Methodology ... 6-54
6.9.2 Significance Criteria ... 6-54
6.9.3 No Federal Action (Alternative Plan 1) ... 6-55
6.9.4 Structural (Alternative Plans 2 and 3) ... 6-55
6.9.5 Nonstructural (Alternative Plan 4) ... 6-57
6.10 Socioeconomic Resources and Environmental Justice ... 6-57
6.10.1 Impact Analysis Methodology ... 6-57
6.10.2 Significance Criteria ... 6-58
6.10.3 No Federal Action (Alternative Plan 1) ... 6-59
6.10.4 Structural (Alternative Plans 2 and 3) ... 6-59
6.10.5 Nonstructural (Alternative Plan 4) ... 6-62
6.10.6 Environmental Justice ... 6-65
6.10.7 Protection of Children ... 6-65
6.11 Hazardous, Toxic, and Radioactive Waste ... 6-66
6.11.1 Impact Analysis Methodology ... 6-66
6.11.2 Significance Criteria ... 6-66
6.11.3 No Federal Action (Alternative 1) ... 6-67
6.11.4 Structural (Alternative Plans 2 and 3) ... 6-67
6.11.5 Nonstructural (Alternative Plan 4) ... 6-68
6.12 Health and Safety ... 6-68
6.13 Infrastructure ... 6-68
6.13.1 Impact Analysis Methodology ... 6-68

6.13.2 Significance Criteria 6-69
6.13.3 No Federal Action (Alternative Plan 1) 6-69
6.13.4 Structural (Alternative Plans 2 and 3) 6-70
6.13.5 Nonstructural (Alternative Plan 4) 6-72
6.14 Cumulative Impacts 6-72
6.14.1 Methodology 6-72
6.14.2 Cumulative Impacts 6-74
6.15 Unavoidable Adverse Impacts 6-77
6.16 Irreversible and Irretrievable Commitments of Resources 6-78
6.17 Relationship Between Short-Term Use of the Environment and the Maintenance and Enhancement of Long-Term Productivity 6-78

CHAPTER 7. PUBLIC INVOLVEMENT, REVIEW AND CONSULTATION 7-1

7.1 Public Involvement Program 7-1
7.2 Institutional Involvement 7-4
7.3 Additional Required Coordination 7-5
7.4 DEIS Distribution List 7-5
7.4.1 Federal Agencies and Elected Officials 7-5
7.4.2 State Agencies and Elected Officials 7-6
7.4.3 Local Agencies and Elected Officials 7-7
7.4.4 Organizations and Individuals 7-7
7.4.5 Public Libraries 7-7

CHAPTER 8. LIST OF PREPARERS 8-1

CHAPTER 9. REFERENCES AND BIBLIOGRAPHY 9-1

CHAPTER 10. ACRONYMS AND GLOSSARY 10-1

10.1 Acronyms Used 10-1
10.2 Glossary 10-3

CHAPTER 11. INDEX 11-1

FIGURES

Figure 1-1. Levisa Fork Basin
Figure 1-2. Site Location Map
Figure 1-3. DPR-1, Floyd County, Kentucky
Figure 1-4. DPR-2, Floyd County, Kentucky
Figure 1-5. DPR-3, Floyd County, Kentucky
Figure 4-1. Structural Measure # 3: Long Floodwall Ending at Wastewater Treatment Plant
Figure 4-2. Structural Measure # 4: Long Floodwall Ending at Big Sandy Community and Technical College
Figure 4-3. Structural Measure # 5: Long Floodwall Ending at Blackbottom
Figure 4-4. Structural Measure # 6: Downtown Prestonsburg – Short Floodwall
Figure 4-5. Structural Measure # 7: Blackbottom Area – Short Floodwall
Figure 4-6. Structural Measure # 8: West Prestonsburg Area Floodwall
Figure 4-7. (A-H) Alignment and Construction Work Limits for Alternative Plans 2 & 3
Figure 5-1. Potential Borrow Areas

Figure 5-2.	Physiographic Regions of Kentucky
Figure 5-3.	Soil Types, Prestonsburg, Kentucky
Figure 5-4.	Air Quality Control Regions of Kentucky
Figure 5-5.	Noise Measurement Locations (May 2004), Prestonsburg, Kentucky
Figure 5-6.	Surface Water Features, Prestonsburg, Kentucky
Figure 5-7. (A-H)	Land Cover Within the Construction Work Limits for Alternative Plans 2 and 3
Figure 5-8.	Historic Site Locations, Prestonsburg, Kentucky
Figure 5-9.	Floyd County School Locations
Figure 5-10.	Floyd County Labor Market
Figure 5-11.	School Locations

CHARTS

Chart 2-1. Estimated Flood Damage within DPR Phase 1 Area ... 2-3
Chart 4-1. Example Levisa Fork Channel Modification ... 4-10
Chart 6-1. Levisa Fork Water Surface Elevation and Flow Volume for Various Storm Events within Proposed Prestonsburg Floodwall Reach ... 6-29
Chart 6-2. Channel Surface Velocities for Levisa Fork 50 Percent Chance (2-Year Frequency) Event within Prestonsburg, Kentucky ... 6-31
Chart 6-3. Channel Surface Velocities for Levisa Fork 1 Percent Chance (100-Year Frequency) Event within Prestonsburg, Kentucky ... 6-31
Chart 6-4. Hjulstrom Diagram Showing Range of Channel Surface Velocities for Levisa Fork, River Station 51-55, Prestonsburg, Kentucky ... 6-32

TABLES

Table 1-1. Implementation Appendices to the General Plan ... 1-9
Table 4-1. Estimated Number of Structures Eligible for Flood Protection ... 4-2
Table 4-2. Location of Previous Nonstructural Projects in Tug Fork and Levisa Fork Basins ... 4-3
Table 4-3. Channel Modification Evaluation at River Station 54.37773 During a One Percent Chance Event ... 4-10
Table 4-4. Tug Fork Structural Projects ... 4-12
Table 4-5. Results of Nonstructural Technique Evaluation ... 4-13
Table 4-6. Results of Structural Technique Evaluation ... 4-14
Table 4-7. Screening Results of Structural Measures within the City of Prestonsburg ... 4-22
Table 4-8. Alternative Plans ... 4-23
Table 4-9. Comparison of Alternatives ... 4-28
Table 4-10. Summary of Environmental Commitments and Mitigation Measures ... 4-38
Table 5-1. Prime Farmland and Hydric Soil Units within Floyd County ... 5-9
Table 5-2. National Ambient Air Quality Standards (NAAQS) ... 5-12
Table 5-3. Sound Pressure Levels of Representative Noises ... 5-15
Table 5-4. Noise Monitoring Locations and Results ... 5-18
Table 5-5. Lower Levisa Fork River Class and Land Use ... 5-21
Table 5-6. Surface Water Standards for waters of the Commonwealth ... 5-25
Table 5-7. Special Status Species Known to Occur in Floyd County ... 5-32
Table 5-8. Cultural Components in Floyd County (From 2005 Office of State Archaeology (OSA) Site Data) ... 5-36

Table 5-9. Previously Recorded Archaeological Sites within 2.0 km of the Project Area........ 5-51
Table 5-10. National Register of Historic Places Listings, Floyd County, Kentucky............... 5-53
Table 5-11. Population Projections for Floyd County, Kentucky 5-55
Table 5-12. Population Change 1990-2000 for Floyd County and U.S. Census-Designated Places 5-55
Table 5-13. 1990 and 2000 Population Characteristics, Floyd County.................................... 5-56
Table 5-14. Total Number and Average Size of Households in Floyd County, Kentucky and in U.S. Census-Designated Places 5-57
Table 5-15. Housing Statistics for Floyd County, Kentucky in 2000 and in U.S. Census-Designated Places 5-58
Table 5-16. Educational Attainment... 5-60
Table 5-17. Major Employers Floyd County 2002... 5-61
Table 5-18. Civilian Labor Force 5-62
Table 5-19. Median Household Income and Per Capita Income.. 5-62
Table 5-20. Major Manufacturers in the Floyd County, Kentucky Area 5-68
Table 5-21. Floyd County Public Water Systems 5-71
Table 5-22. Maximum Traffic Volumes (Passenger Cars Per Hour Per Lane) Per Level of Service 5-74
Table 5-23. Airport Operational Statistics within the vicinity of Floyd County, Kentucky...... 5-75
Table 6-1. Peak Noise Levels (dBA, attenuated) Expected from Typical Construction Equipment 6-22
Table 6-2. Existing Levisa Fork Velocity and Predicted Change with Proposed Floodwall 6-30
Table 6-3. Approximate Moveable Particle Size for Levisa Fork Storm Events within Prestonsburg Reach (River Station 51 – 55)... 6-33
Table 6-4. Summary of Impacts to Streams within the Proposed Project Length.................... 6-42
Table 6-5. Land Cover Impacts for Alternative Plan 2 (Long Wall Ending at BSCTC)........... 6-44
Table 6-6. Land Cover Impacts for Alternative Plan 3 (Long Wall Ending at Blackbottom)... 6-46
Table 6-7. Proposed Riparian Species for Revegetation 6-52
Table 6-8. Invasive Species within Riparian Forest Habitat in Southeastern Kentucky 6-53
Table 7-1. Additional Public Involvement Activities... 7-2

PHOTOS

Photo 2-1. Simulated Recurrence of 1977 Flood in Prestonsburg, Kentucky 2-3

ANNEXES

ANNEX A. PUBLIC AND AGENCY INVOLVEMENT

ANNEX B. ECOLOGICAL SUMMARY REPORT

ANNEX C. 404(b)(1) ANALYSIS

ANNEX D. COMMUNITY COHESION REPORT

ANNEX E. PHASE I ENVIRONMENTAL SITE ASSESSMENT HTRW REPORT

EXECUTIVE SUMMARY

This Executive Summary provides a summary of the Purpose and Need for agency action, the alternatives under consideration, and the impacts of each alternative on the human and natural environment.

Study Area

Floyd County is located within the Appalachian Mountains of Eastern Kentucky, in the watershed of the Levisa Fork of the Big Sandy River. The study area includes those floodplain areas that would be affected by a recurrence of the April 1977 flood within the Levisa Fork basin in Floyd County, KY. The study area, primarily residential in nature, includes incorporated areas of Prestonsburg, Allen, Wayland, and Wheelwright, and unincorporated areas. Flood damage reduction within the incorporated limits of the City of Martin is being implemented separately under the Section 202 authority, and is not included in this action. The floodplain areas located along tributaries of the Levisa Fork within Floyd County that would be affected by backwater flooding from a recurrence of the April 1977 flood are also included in the geographic scope of the Proposed Action study area.

Purpose of and Need for Agency Action

The recurring floods that characterize the Levisa Fork Basin result in loss of life, property damages, lost business revenues, lost school days, and shrinking tax revenues. Since the earliest Levisa Fork Basin settlements, the residents faced the problem of frequent and severe flooding. Streams, in Floyd County as well as other Appalachian areas, frequently undergo extreme flow fluctuations resulting in overbank flooding and inundation of cultural development in the floodplains.

The vast majority of floodplain communities and other cultural improvements are threatened by recurring floods, a situation that is likely to continue unless there is intervention. Major floods in Floyd County occurred in 1862, 1918, 1929, 1939, 1955, 1957, 1963, 1967, 1977, 1984, and 2003.

Emergency and recovery costs from the recurring flooding drain county and state resources. Loss of residential structures and businesses due to flooding further strains the tax base of the county, making recovery more difficult with each event. In addition to the severe financial losses caused by frequent flooding, there are adverse social, physical, and psychological effects on the human population. Often the floods sever access to a community or neighborhood, effectively isolating elements of the population. Utilities such as water, gas, and electricity are lost for days. Subsequent impacts to local economies due to business closures and loss of taxable property can further strain a community's ability to recover from repetitive flooding. All of this results in significant trauma and hardship for the people residing in and around the area and reinforces their strong concern and interest in developing and implementing effective flood damage reduction measures.

The April 1977 storm system resulted in a series of heavy rainfalls over a 72-hour period in Dickenson and Buchanan Counties, VA and portions of Pike County, KY. The aggregation of these floodwaters began to reach its peak in the floodplains of Pike and Floyd Counties, KY. A recurrence of the April 1977 flood would result in damages to over 4,770 structures in the Levisa Fork basin, approximating $282 million in 2004 dollars. In addition to structural damages, flooding damages to transportation facilities within the Levisa Fork basin would approach approximately $10.8 million in 2004 dollars. Additional damages to infrastructure such as sewage and water treatment facilities, airports, substations, and railroads, have not been quantified. Floyd County would incur $133 million in damages (2004 dollars). Most of the riverbank along the City of Prestonsburg is near the elevation corresponding to a one percent chance[1] event.

The purpose of the proposed Levisa Fork (Floyd County, KY) Flood Damage Reduction Project is to reduce financial and personal losses, and social and economic disruptions within the Levisa Fork Basin. Solving these persistent problems could provide opportunities for improving other aspects of communities in the project area. The purpose of this DPR-1 feasibility study is to identify the least-cost plan for reducing damages. Agency action is needed to comply with Federal legislation, in order to limit loss of life and property within the study area from future flood events.

Authority

The Levisa Fork Basin (the land area, or watershed, drained by the Levisa Fork of Big Sandy River) was devastated in the April 1977 flood, causing an estimated $280 million (2004 price level) in damages. As a direct result of the losses from this flood, the Energy and Water Development Appropriations Act of 1981 (Public Law (PL) 96-367) provided authorization for development of flood protection measures for the Levisa and Tug Forks of the Big Sandy River. Section 202 of that authorization directed the Secretary of the Army, acting through the Chief of Engineers, to design and construct, at full Federal expense, flood damage reduction measures in those areas impacted by the flood.

Based upon the Section 202 legislation, the United States Army Corps of Engineers (USACE) submitted its proposed plans for flood damage reduction measures to the Assistant Secretary of the Army for Civil Works (ASA(CW)) in the "Section 202 General Plan for Project Implementation," (hereafter referred to as the General Plan) dated 28 April 1982. Subsequent to the authorizing legislation another major flood occurred in the Levisa Fork and Tug Fork Basins in May 1984 resulting in damages of approximately $169 million (2004 price level). As a result of the May 1984 flooding, legislation (PL 98-332) was passed directing expeditious implementation of the nonstructural features of the General Plan with $21 million specifically appropriated for that purpose. The new legislation directed the USACE to "...implement immediately nonstructural flood control measures such as relocation sites, floodproofing and floodplain evacuation as described in the General Plan..."

[1] Commonly referred to as the 100-year frequency flood. A flood event that statistically has a 1 out of 100 (or one percent) chance of being equaled or exceeded on a specific watercourse in any given year.

This Detailed Project Report 1 (DPR-1) for Prestonsburg and draft Environmental Impact Statement (DEIS) for the Lower Levisa Fork, Floyd County, Kentucky, Flood Damage Reduction Project is submitted as Appendix X to the Section 202 General Plan. The appendix is prepared in accordance with and in response to the above-cited legislation and Congressional and ASA(CW) directives.

Scope of the Report

The scope of the project described in this detailed project report is limited to reduction of flood damages to structures within Floyd County which would be damaged by a recurrence of the April 1977 flood.

The DPR-1 addresses Phase 1 of the Floyd County flood damage reduction project. Alternatives developed for Phase I include both structural (floodwall) and nonstructural aspects. Phases 2 and 3 of the project will be addressed in subsequent DPRs. At this time, the USACE considers nonstructural measures to be the most appropriate for the Phase II and III areas. This will be re-evaluated and documented during the Phase II and Phase III DPR analyses.

The NEPA analysis in this document addresses all three study phases of the project. Alternative measures evaluated for the Phase 1 area include both structural and nonstructural measures as developed in the DPR-1. Alternative measures evaluated for Phase 2 and Phase 3 areas are limited to nonstructural measures. This DEIS looks broadly at the entire county in terms of nonstructural measure implementation and cumulative impacts. The Phase 2 and Phase 3 Supplemental DPR analyses will include supplemental NEPA documentation. If structural measures are included in the Phase 2 and Phase 3 areas, their potential impacts will be evaluated at that time

Scoping and Public Involvement

Two public scoping meetings were held in order to receive public comments on the proposed actions and to assist in defining the scope of analysis. The meetings were held at the Prestonsburg High School on November 13, 2003 and March 9, 2004. Community surveys were also conducted as part of the socioeconomic impact and community cohesion analyses.

Planning Objectives

The USACE developed specific planning objectives for the Floyd County project. The primary planning objective is to formulate the most cost effective, socially acceptable, and environmentally sound project alternatives to reduce financial and personal losses, and social and economic disruptions due to flooding.

Based upon the identified problems and opportunities within the Floyd County Project area, local desires, and the intent of the aforementioned project authorization, the USACE has identified the following planning objectives of this study;

Planning Objective 1: Develop the most cost-effective, implementable plan that provides the mandated flood protection, complies with Section 202 of PL 96-367 and satisfies other applicable laws and regulations.

Planning Objective 2: Reduce, to the extent possible, financial and personal losses due to flooding.

Planning Objective 3: Maintain, to the extent possible, the social and cultural resources of the area.

Planning Objective 4: Minimize, to the extent possible, the social and economic disruptions due to project construction and mandatory relocation.

Planning Objective 5: Develop the most socially acceptable and environmentally sound plan.

Alternatives

A variety of structural and nonstructural measures were screened for feasibility. Based on a screening level review of nonstructural and structural measures, two alternative plans were developed that incorporate feasible components identified. A third plan consists of applying nonstructural measures throughout the Floyd County project area. The fourth plan is the No Federal Action or the "Without Project" Alternative. The selection of the final array of the alternatives was based on the planning objectives. The alternative plans are presented in **Table ES-1**. A summary of the alternatives is provided in **Table ES-2.** Based on this comparison, Alternative Plan 2 is the USACE's preferred alternative plan.

Table ES-1. Alternative Plans

Alternative Plan No.	Name	Description
1	No Federal Action	No action by the Federal government to implement flood damage reduction program
2 (Preferred)	Long Wall Ending at BSCTC plus Nonstructural Program	Includes a floodwall in Prestonsburg, Kentucky extending from the downtown area to the Big Sandy Community and Technical College plus a voluntary nonstructural program in the remainder of Floyd County.
3	Long Wall Ending at Blackbottom plus Nonstructural Program	Includes a floodwall in Prestonsburg, Kentucky extending from the downtown area to the Blackbottom neighborhood plus a voluntary nonstructural program in the remainder of Floyd County.
4	Total Nonstructural Program	Includes a voluntary nonstructural program throughout Floyd County.

Table ES-2. Comparison of Alternatives					
		Alternative Plan 1 No Federal Action	**Alternative Plan 2 Nonstructural and Floodwall to BSCTC (Preferred)**	**Alternative Plan 3 Nonstructural and Floodwall to Blackbottom Area**	**Alternative Plan 4 Nonstructural Program**
PLANNING OBJECTIVES	Most cost-effective, implementable plan that provides the mandated flood protection.	Does not meet planning objective. Federal expenditures to subsidize the flood insurance program and to assist in flood emergency and recovery operations would continue.	$140,740,000 (Venture Level Costs) Floodwall: $ 75,497,000 Nonstructural: $ 65,214,000	$142,171,000 (Venture Level Costs) Floodwall: $ 65,197,000 Nonstructural: $ 76,974,000	$221,470,000 (Venture Level Costs)
	Reduce, to the extent possible, financial and personal losses due to flooding.	Does not meet planning objective. No flood damage reduction would be provided.	Floodwall would protect 311 eligible structures and 331 additional ineligible structures[2]. Nonstructural program offered to estimated remaining 3,319 eligible structures throughout Floyd County.	Floodwall would protect 308 eligible structures and 294 additional ineligible structures. Nonstructural program offered to estimated remaining 3,322 eligible structures throughout Floyd County.	Nonstructural program for estimated 3,630 eligible structure throughout Floyd County,
	Maintain, to the extent possible, the social and cultural resources of the area.	Does not meet planning objective. Indirect and long-term impacts would be negative due to continued flood damage.	*Structural Areas:* Protects downtown Prestonsburg, Blackbottom Area and BSCTC. *Nonstructural Areas:* Affected by participation rate and also by mix of floodproofing and relocation.	*Structural Areas:* Protects downtown Prestonsburg and Blackbottom Area. *Nonstructural Areas:* Affected by participation rate and also by mix of floodproofing and relocation.	Affected by participation rate and also by mix of floodproofing and relocation.
	Minimize, to the extent possible, the social and economic disruptions due to project construction and mandatory relocation.	Meets this planning objective, but does not provide flood damage reduction.	Affected by participation rate and also by mix of floodproofing and relocation. *Structural Areas:* Short-term impacts from floodwall construction. Mandatory acquisition of nine residences and one government structure (former emergency services office) to build floodwall.	Affected by participation rate and also by mix of floodproofing and relocation. *Structural Areas:* Short-term impacts from floodwall construction. Mandatory acquisition of nine residences and one government structure (former emergency services office) to build floodwall.	Affected by participation rate and also by mix of floodproofing and relocation. Long-tem but localized impacts from construction. No mandatory acquisitions. Could have more disruptive effect on City of Prestonsburg than other Plans because nonstructural measures offered in downtown area.
	Develop the most socially acceptable and environmentally sound plan.	Does not meet planning objective. No flood damage reduction would be provided.	Voluntary program in nonstructural areas is socially acceptable. Nine mandatory relocations in floodwall area.	Voluntary program in nonstructural areas is very socially acceptable. Nine mandatory relocations in floodwall area.	Generally socially acceptable due to program's voluntary nature. Could have more disruptive effect on City of Prestonsburg than other Plans because nonstructural measures offered in downtown area.

[2] Ineligible structures protected by the floodwall include structures partially protected by the one-foot "freeboard" and structures not meeting the "habitability" standard.

Table ES-2. Comparison of Alternatives					
		Alternative Plan 1 No Federal Action	**Alternative Plan 2 Nonstructural and Floodwall to BSCTC (Preferred)**	**Alternative Plan 3 Nonstructural and Floodwall to Blackbottom Area**	**Alternative Plan 4 Nonstructural Program**
PHYSICAL RESOURCES	Land Use / Land Cover	No direct impact. A minor, indirect adverse effect could occur because periodic flooding may discourage investment, resulting in deterioration of structures and loss of property value for flood-prone areas.	*Nonstructural Areas:* Long term beneficial impacts as future human habitation of the floodway would be prohibited and the land would revert to its natural condition. Some land outside the floodway could be filled and redeveloped in accordance with local land use plans. *Structural Areas:* The floodwall will disturb approximately 63 acres. Nine residences will be relocated by the floodwall construction. It is likely that vacant structures and vacant lots will be infilled or redeveloped after the floodwall is in place. Land values could rise as a result of the flood protection.	*Nonstructural Areas:* Long term beneficial impacts as future human habitation of the floodway would be prohibited and the land would revert to its natural condition. Some land outside the floodway could be filled and redeveloped in accordance with local land use plans. *Structural Areas:* The floodwall will disturb approximately 39 acres. Nine residences will be relocated by the floodwall construction. It is likely that vacant structures and vacant lots will be infilled or redeveloped after the floodwall is in place. Land values could rise as a result of the flood protection.	Long term beneficial impacts as future human habitation of the floodway would be prohibited and the land would revert to its natural condition. Some land outside the floodway could be filled and redeveloped in accordance with local land use plans. The amount of land use change within the floodplain would depend on the participation rate for this voluntary program.
	Topography and Drainage Geology and Soils	Erosion and sedimentation associated with periodic flooding would continue. Erosion of Levisa Fork banks associated with recurrent flooding would also continue. The existing instability of the banks of May Branch, Trimble Branch and Campus Branch at their confluence with the Levisa Fork would continue or worsen.	*Nonstructural Areas:* Minimal impact to the geology and soils are anticipated. Direct impacts would be limited to relatively small areas where some of the nonstructural measures (raise-in-place, single-facility ringwalls, etc.) would occur. Minor indirect impacts to geology and soils could result from clearing and grading activities associated with the relocation of residences and businesses to flood safe locations. *Structural Areas:* Minor direct impacts to geology and soils would include localized soil disturbance during the construction of either floodwall. Removal of material from borrow areas could change drainage patterns.		Minimal impact to geology and soils. Direct impacts would be limited to relatively small areas where some of the nonstructural measures (raise-in-place, single-facility ringwalls, etc.) would occur. Minor indirect impacts to geology and soils could result from clearing and grading associated with the relocation of residences and businesses to flood safe locations.
	Air Quality	No direct impacts. Localized fugitive dust and vehicle emissions associated with cleanup from recurrent flooding events would continue.	*Nonstructural Areas:* Direct, short-term, localized impacts from construction activities. *Structural Areas:* Floodwall construction activities have the potential to cause localized temporary, nuisance air quality impacts.		Direct, short-term, localized impacts from construction activities.
	Noise and Vibration	No direct impacts. Continued periodic noises from equipment and vehicles during post-flood cleanup.	*Nonstructural Areas:* Direct short-term impacts would include increased localized noise from construction and demolition activities, construction equipment, and haul trucks. No long-term impacts are anticipated. *Structural Areas:* Temporary noise during floodwall construction could significantly impact area residents, businesses, and schools during peak construction periods. Long-term occasional direct impacts from low-frequency noise and vibration generated by the proposed pump stations.		*Nonstructural Areas:* Direct short-term impacts would include increased localized noise from construction and demolition activities, construction equipment, and haul trucks. No long-term impacts are anticipated.

Table ES-2. Comparison of Alternatives					
		Alternative Plan 1 **No Federal Action**	**Alternative Plan 2** **Nonstructural and Floodwall to BSCTC (Preferred)**	**Alternative Plan 3** **Nonstructural and Floodwall to Blackbottom Area**	**Alternative Plan 4** **Nonstructural Program**
ECOLOGICAL RESOURCES	Water Quality and Aquatic Resources	No direct impacts to water quality or aquatic resources. Indirect impacts to the Levisa Fork and other area water and aquatic resources would continue due to human encroachment on riparian habitats and buffers, point and non-point source pollutants, and pollution associated with periodic flooding in developed areas within the floodplain. Periodic flooding would continue to flood wastewater treatment beds, sending contaminants into the Levisa Fork.	*Nonstructural Areas:* Minor indirect impacts due to increased sedimentation during construction activities. *Structural Areas:* Armored toe bank stabilization near floodwalls would not significantly affect the stream characteristics during smaller storm events. During large storm events, floodwaters would be more restricted within floodwall limits, increasing water velocity. Trimble, May and Campus Branches would be directly impacted. Direct, short-term adverse effects on Levisa Fork, and Trimble, May and Campus Branches water quality due to increased sedimentation during construction. Direct, long-term beneficial impacts to the Levisa Fork would result from stabilization of the Trimble, May, and Campus Branches because of less erosion and sedimentation.	*Nonstructural Areas:* Minor indirect impacts due to increased sedimentation during construction activities. *Structural Areas:* Armored toe bank stabilization near floodwalls would not significantly affect the stream characteristics during smaller storm events. During large storm events, floodwaters would be more restricted within floodwall limits, increasing water velocity. Trimble and May Branches would be directly impacted. Direct, short-term adverse effects on Levisa Fork, and Trimble and May Branches water quality due to increased sedimentation during construction. Direct, long-term beneficial impacts to the Levisa Fork would result from stabilization of the Trimble and May Branches because of less erosion and sedimentation.	Minor indirect impacts due to increased sedimentation during construction activities.
	Terrestrial Habitat and Wildlife	No direct impacts to terrestrial habitat and wildlife. Indirect impacts as limited new development in the floodplain would occur and maintenance of existing development would continue to impact habitat and suppress area wildlife. A beneficial indirect impact could occur as continued flooding could lead to increased vegetation if flood damaged structures are not replaced.	*Nonstructural Areas:* No direct adverse impacts. Minor disturbances in the immediate vicinity of existing structures could occur. Evacuated floodplain areas could be allowed to undergo vegetative succession thereby increasing habitat diversity for many species. *Structural Areas:* Vegetation directly in the alignment of the floodwall (63 acres) would be permanently removed and would no longer provide habitat for terrestrial organisms.	*Nonstructural Areas:* No direct adverse impacts. Minor disturbances in the immediate vicinity of existing structures could occur. Evacuated floodplain areas could be allowed to undergo vegetative succession thereby increasing habitat diversity for many species. *Structural Areas:* Vegetation directly in the alignment of the floodwall (39 acres) would be permanently removed and would no longer provide habitat for terrestrial organisms.	No direct adverse impacts. Minor disturbances in the immediate vicinity of existing structures could occur. Evacuated floodplain areas could be allowed to undergo vegetative succession thereby increasing habitat diversity for many species.

Table ES-2. Comparison of Alternatives

		Alternative Plan 1 No Federal Action	Alternative Plan 2 Nonstructural and Floodwall to BSCTC (Preferred)	Alternative Plan 3 Nonstructural and Floodwall to Blackbottom Area	Alternative Plan 4 Nonstructural Program
ECOLOGICAL RESOURCES	Wetlands	No direct impacts. Indirect impacts from continued encroachment of humans on riparian habitats adjacent to Levisa Fork could negatively impact the limited wetland areas found in the Levisa Fork floodplain.	*Nonstructural Areas:* No direct or indirect impacts. *Structural Areas:* Approximately 0.06 acres of a 0.4-acre palustrine emergent wetland within proposed storage area for interior drainage during flood events. Potential beneficial effect to this wetland is anticipated.	*Nonstructural and Structural Areas:* No direct or indirect impacts	No direct or indirect impacts.
ECOLOGICAL RESOURCES	Threatened and Endangered Species	No direct impacts. Indirect impacts from continued encroachment of humans on riparian habitats adjacent to Levisa Fork could negatively impact habitat for special status species, including the endangered Indiana bat.	*Nonstructural Areas:* Indirect positive impact as reduced development within the floodplain may improve riparian habitat for some special status species. *Structural Areas:* Potential direct, adverse impact to summer roosting and foraging habitat for the Indiana bat.		Indirect positive impact as reduced development within the floodplain may improve riparian habitat for some special status species.
CULTURAL RESOURCES	Architecture/ Historic Resources	No direct impact. Indirect impact to historic resources could be damaged by periodic floods.	*Nonstructural Areas:* During field investigations, some properties eligible for voluntary evacuation or floodproofing could be determined to be eligible for listing on the NRHP. *Structural Areas:* Several structures listed on the NRHP, as well as the Front Street Historic District, are within the general Prestonsburg structural area. Some potential that structural activities would occur within NRHP boundaries, although not affecting structures.		*Nonstructural Areas:* During field investigations, some properties eligible for voluntary evacuation or floodproofing could be determined to be eligible for listing on the NRHP.
CULTURAL RESOURCES	Archaeological Resources	No direct impact. Indirect impact could occur if archaeological resources in areas where erosion would continue or new development in the floodplain.	*Nonstructural Areas:* Archaeological resources could be identified on properties eligible for the nonstructural programs. *Structural Areas:* Several structures listed on the NRHP, as well as the Front Street Historic District, are within the general Prestonsburg structural area and potential exists that archaeological resources could be identified.		Archaeological resources could be identified on properties eligible for the nonstructural programs.

Table ES-2. Comparison of Alternatives

		Alternative Plan 1 No Federal Action	Alternative Plan 2 Nonstructural and Floodwall to BSCTC (Preferred)	Alternative Plan 3 Nonstructural and Floodwall to Blackbottom Area	Alternative Plan 4 Nonstructural Program
HUMAN ENVIRONMNENT	Socio-economics and Community Cohesion	Recurring damages from major floods would limit the potential for future growth and economic development in Floyd County. The Prestonsburg residential and business district would not be offered flood damage reduction.	Plan would protect and preserve county center, the City of Prestonsburg through construction of a floodwall. A small number of construction jobs would be created during the 15-year nonstructural program. A portion of the displaced population would relocate to existing vacant structures or leave the area but most of the displaced population would be expected to remain in the area. Indirect impacts could include a weakening of the social network within the county and smaller neighborhood areas in particular.		Could have disruptive effect on City of Prestonsburg as some government functions and businesses are relocated. A small number of construction jobs would be created during the 15-year nonstructural program. A portion of the displaced population would relocate to existing vacant structures or leave the area but most of the displaced population would be expected to remain in the area. Indirect impacts could include a weakening of the social network within the county and smaller neighborhood areas in particular.
	Environmental Justice	No impact.	No adverse or disproportionate impacts.	No adverse or disproportionate impacts.	No adverse or disproportionate impacts.
BUILT ENVIRONMENT	Recreation	No impact. Flooding would continue to temporarily restrict access to River Park.	*Nonstructural Areas:* Long-term indirect benefit from additional greenspace in floodplain. *Structural Areas:* Short-term impact to recreational resources would occur at the athletic fields at Prestonsburg High School during construction. Indirect impact as reduce access to water. Gate closures would restrict access to River Park. Walking path at BSCTC would be relocated away from river.	*Nonstructural Areas:* Long-term indirect benefit from additional greenspace in floodplain. *Structural Areas:* Short-term impact to recreational resources would occur at the athletic fields at Prestonsburg High School during construction. Indirect impact as reduce access to water. Gate closures would restrict access to River Park.	Long-term indirect benefit from additional greenspace in floodplain.
	Aesthetic and Scenic Resources	No impact.	*Structural Areas:* View of Levisa Fork will be blocked in floodwall areas.		No impact.
	Hazardous, Toxic, and Radioactive Wastes	No direct impact.	*Nonstructural Areas:* Individual properties identified for demolition or nonstructural measures, such as ringwalls, will be evaluated for HTRW and any work necessary to address potential HTRW issues will be addressed prior to construction or demolition activities.		Individual properties identified for demolition or nonstructural measures, such as ringwalls, will be evaluated for HTRW and any work necessary to

Table ES-2. Comparison of Alternatives					
		Alternative Plan 1 No Federal Action	**Alternative Plan 2 Nonstructural and Floodwall to BSCTC (Preferred)**	**Alternative Plan 3 Nonstructural and Floodwall to Blackbottom Area**	**Alternative Plan 4 Nonstructural Program**
			Structural Areas: Prior to construction activities, each property affected would be evaluated for HTRW and any work necessary to address potential HTRW issues would be addressed prior to construction or demolition activities.		address potential HTRW issues will be addressed prior to construction or demolition activities.
BUILT ENVIRONMENT	Health and Safety	No direct impact.	*Nonstructural Areas*: Reduce the number of people threatened by flooding, stranding, drowning, or other safety issues. *Structural Areas:* The Prestonsburg High School and BSCT would be located adjacent to a construction staging area, the floodwall, a pump station, and ponding area. Increased dust, noise and vibration would be expected during construction activities and potential exists for children to be hurt on floodwall. Temporary safety issues at construction and borrow sites.	*Nonstructural Areas:* Reduce the number of people threatened by flooding, stranding, drowning, or other safety issues. *Structural Areas:* The Prestonsburg High School would be located adjacent to a construction staging area, the floodwall, a pump station, and ponding area. Increased dust, noise and vibration would be expected during construction activities and potential exists for children to be hurt on floodwall. Temporary safety issues at construction and borrow sites.	Reduce the number of people threatened by flooding, stranding, drowning, or other safety issues.
	Infrastructure	Substations, power lines and treatment plants would continue to be flooded, put out of service and damaged, costing money to restore service. Public services would continue to be interrupted by flooding.	*Nonstructural Areas:* In the wider Floyd County nonstructural implementation area, minor direct effect on utilities would be caused by relocations. Some flooding damage to utilities could still occur. *Structural Areas:* Water, sewer, telephone, and cable lines would need to be relocated near the floodwall.		*Nonstructural Areas:* In the wider Floyd County nonstructural implementation area, minor direct effect on utilities would be caused by relocations. Some flooding damage to utilities could still occur.
	Traffic and Transportation	Flooding would continue to periodically interrupt access and restrict traffic.	*Nonstructural Areas:* Reduced levels of flooding would reduce access interruptions. *Structural Areas:* Gate closures would restrict traffic (including emergency vehicles) but less than traffic interruptions caused by high water. Temporary traffic constraints at construction and borrow sites.		Flooding would continue to periodically interrupt access and restrict traffic but at a slightly lesser level than No Action Alternative due to indirect benefits of nonstructural program.

CHAPTER 1. STUDY INFORMATION

1.1 Project Background

The Levisa Fork Basin (the land area, or watershed, drained by the Levisa Fork of Big Sandy River) was devastated in the April 1977 flood, causing an estimated $280 million (2004 price level) in damages. As a direct result of the losses from this flood, the Energy and Water Development Appropriations Act of 1981 (Public Law (PL) 96-367) provided authorization for development of flood protection measures for the Levisa and Tug Forks of the Big Sandy River. Section 202 of that authorization directed the Secretary of the Army, acting through the Chief of Engineers, to design and construct, at full Federal expense, flood damage reduction measures in those areas impacted by the flood. The Levisa Fork basin is shown in **Figure 1-1**.

Based upon the Section 202 legislation, the United States Army Corps of Engineers (USACE) submitted its proposed plans for flood damage reduction measures to the Assistant Secretary of the Army for Civil Works (ASA(CW)) in the "Section 202 General Plan for Project Implementation," (hereafter referred to as the General Plan) dated 28 April 1982. The General Plan summarized the Tug Fork Valley General Design Memorandum (GDM) which evaluated three alternative plans (Plans E-1, F-1 and G-1) for the entire Tug Fork Basin and recommended implementation of Plan F-1. The 1982 General Plan discussed potential flood damage reduction for the Levisa Fork Basin but did not recommend specific measures or projects within Floyd County.

Subsequent to the authorizing legislation another major flood occurred in the Levisa Fork and Tug Fork Basins in May 1984 resulting in damages of approximately $169 million (2004 price level). As a result of the May 1984 flooding, legislation (PL 98-332) was passed directing expeditious implementation of the nonstructural features of the General Plan with $21 million specifically appropriated for that purpose. The new legislation directed the USACE to "...implement immediately nonstructural flood control measures such as relocation sites, floodproofing and floodplain evacuation as described in the General Plan..."

1.2 Purpose of the Report

This report presents the findings of a feasibility investigation which was conducted to identify the most cost-effective plan to provide flood damage reduction improvements in the Levisa Fork basin within Floyd County, Kentucky (KY).

USACE, Huntington District, is the lead agency for this action. Flood damage reduction would be accomplished by implementing a number of structural (e.g., flood walls) and nonstructural (e.g., relocations) measures as described in this document.

1.3 Study Authority

The Detailed Project Report 1 (DPR-1) for Prestonsburg and the Lower Levisa Fork, Floyd County, Kentucky, Flood Damage Reduction Project is submitted as Appendix X to the Section 202 General Plan. The appendix is prepared in accordance with and in response to the following Congressional and ASA(CW) directives.

A. Section 202 of PL 96-367 (October 1980).

(1) Authorizes design and construction at full Federal expense of flood control measures as the USACE determines necessary and advisable.

(2) Requires affording a level of protection sufficient to prevent any future losses to the community from a recurrence of a flood such as the April 1977 flood.

(3) Non-Federal interests shall operate and maintain all such works after their completion, in accordance with regulations prescribed by the Secretary of the Army.

(4) Congress determined that: The benefits attributable to the project objectives exceed the costs of the measures authorized therein.

B. ASA(CW) Memo for the Acting Director of Civil Works (12 August 1982).

States in part: "The Corps should proceed to do whatever it can through proper design and by requiring adoption of appropriate nonstructural measures by local interests to reduce the intangible costs of a levee or floodwall failure or overtopping."

C. Fiscal Year (FY) 1982 Supplemental Appropriation Act (PL 97-257).

States in part: "Flood control measures authorized by Section 202 of the 1981 Energy and Water Development Appropriations Act involving high levees and floodwalls in urban areas should provide for a Standard Project Flood (SPF)[3] level of protection when consequences from overtopping caused by large floods would be catastrophic."

D. ASA(CW) Memo for the Acting Director of Civil Works (4 October 1982).

States in part and referencing PL 97-257 as quoted previously: "In order to comply with this Congressional direction your proposed plan for structural protection at each community will have to include an evaluation in terms of this legislative provision."

E. Senate Report (No. 97-673) on FY 1983 Energy and Water Development Appropriations Act (6 December 1982).

States in part: "The Committee directs the Secretary of the Army, acting through the Chief of Engineers, to proceed as rapidly as possible with planning, engineering, land acquisition, and construction of the projects authorized by Section 202 of PL 96-367 ... with respect to the Tug Fork Valley, the Corps is directed to proceed to implement those

[3] A Standard Project Flood is defined as the discharge expected to result from the most severe combination of meteorological and hydrological conditions that are reasonably characteristic of the geographic region involved.

measures, structural and nonstructural, identified in the F-1 plan as prepared by the Huntington District office.... The Corps should proceed with all planning efforts for those areas not presently afforded flood protection or for which such plans have not previously been complete."

F. House Joint Resolution 492 (PL 98-332, 3 July 1984).

(1) States in part: "Not withstanding current administrative procedures, the Secretary of the Army, acting through the Chief of Engineers, is directed to implement immediately nonstructural flood control measures such as relocation sites, floodproofing and floodplain acquisition and evacuation as described in the General Plan for Section 202 Program Implementation...."

(2) Appropriated $21 million to remain available until expended for nonstructural measures.

G. Section 103b. of PL 99-662 (Water Resources Development Act (WRDA) 1986)

States in part: “the non-Federal share of the cost of nonstructural flood control measures shall be 25 percent of the cost of such measures. The non-Federal interests for any such measures shall be required to provide all lands, easements, rights-of-way, dredged material disposal areas, and relocations necessary for the project, but shall not be required to contribute any amount in cash during construction of the project."

H. PL 104-206 (30 September 1996).

States in part in Section 105: “From the date of enactment of this Act, non-structural flood control measures implemented under Section 202(a) of PL 96-367 shall prevent future losses that would occur from a flood equal in magnitude to the April 1977 level by providing protection from the April 1977 level or the 100-year frequency event whichever is greater.”

I. Section 202 of PL 104-303 (WRDA of 1996).

States in part in Section 202(b): “the Secretary of the Army shall revise the criteria and procedures for calculating the non-Federal sponsor’s ability to pay the non-Federal cost share.”

J. PL 106-336 (The Energy and Water Development Appropriations Act of 2000)

Appropriates $25,150,000 for the Levisa and Tug Forks of the Big Sandy River and Upper Cumberland River.

1.4 Planning Process and Report Organization

1.4.1 Planning Process

The Federal objective of water resources planning is to contribute to national economic development while protecting the nation's environment. The Principles and Guidelines, published in 1983 by the U. S. Water Resources Council and used during the study process, have this single Federal objective but provide flexibility to address other state, local, national and international concerns relevant to the planning setting (see Step 3). The Principles and Guidelines prescribed the following six-step planning process to solve problems.

Step 1: Identify water resources problems in the study area.

Step 2: Collect data on the problems identified.

Step 3: Develop alternatives to solve the problems.

Step 4: Evaluate the effects of the alternatives.

Step 5: Compare alternatives.

Step 6: Select a plan for recommendation or decide to take no action. The alternative plan with the greatest net economic benefits consistent with protecting the nation's environment is normally selected. An exception may be granted by the Secretary of the Army.

As expressed in subparagraph (c) of the 1982 legislation, traditional cost/benefit analysis was set aside as a means of project justification. However, the USACE Great Lakes and Ohio River Division is required under Corps of Engineers Ohio River Division Regulation (CEORD-R) 1105-2-404, *Planning Civil Works Projects Under the Environmental Operating Principals,* effective May 1, 2003 to identify a cost-effective alternative that also meets project objectives.

Economic and environmental evaluation procedures have been incorporated into the Principles and Guidelines to provide water resources agencies the best current analytical techniques available. Under the National Environmental Policy Act (NEPA) and other regulations governing the formulation of water resources projects, the USACE is required to consider potential impacts of the Proposed Action on social, economic, environmental, and health and welfare aspects of the affected communities and residents in the project study area.

1.4.2 Report Organization

This integrated report, *Draft Feasibility Report for the Prestonsburg and Lower Levisa Fork portions of Floyd County and Environmental Impact Statement (EIS)*, addresses specific guidance for USACE feasibility reports and NEPA for the proposed project.

- Chapter 1, *Study Information,* describes the purpose, location, and scope of the study and frames the decision to be made.
- Chapter 2, *Purpose and Need*, identifies problems and opportunities to be addressed.
- Chapter 3, *Study Objectives*, expresses desired outcomes as objectives.
- Chapter 4, *Alternatives*, discusses the development of alternatives formulated to address these objectives. These alternatives include a plan of no action and various combinations of structural and nonstructural measures. The preferred

feasible plan is identified, based on the analysis contained in Chapter 6, and implementation requirements are identified.

- Chapter 5, *Affected Environment*, describes the physical, biological, and human baseline conditions in the Floyd County area, with emphasis on those resources potentially impacted by the Proposed Action and Alternatives.
- Chapter 6, *Environmental Consequences*, analyzes the potential environmental, cultural and socioeconomic effects of the proposed actions and considered alternatives. This analysis is required by NEPA (42 United States Code (USC) 4321 *et seq.*), the Council on Environmental Quality (CEQ) Regulations Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations (CFR) 1500-1508), and Engineer Regulations (ER) 200-2-2 and ER 1105-2-100.

1.5 Project Area Location and Phasing

1.5.1 Location

Floyd County is located within the Appalachian Mountains of Eastern Kentucky, in the watershed of the Levisa Fork of the Big Sandy River, as shown in **Figure 1-2**. The study area includes those floodplain areas that would be affected by a recurrence of the April 1977 flood within the Levisa Fork basin in Floyd County, KY. The study area, primarily residential in nature, includes incorporated areas of Prestonsburg, Allen, Wayland, and Wheelwright, and unincorporated areas. Flood damage reduction within the incorporated limits of the City of Martin is being implemented separately under the Section 202 authority, and is not included in this action. The floodplain areas located along tributaries of the Levisa Fork within Floyd County that would be affected by backwater flooding from a recurrence of the April 1977 flood are also included in the geographic scope of the Proposed Action study area.

1.5.2 Project Phasing

The Floyd County flood damage reduction project includes three study phases.

- Phase 1 includes the City of Prestonsburg and the community of Auxier. Streams within the study area include the Levisa Fork, Johns Creek, Bull Creek, Brandykeg Creek, and part of Abbott Creek, Little Paint Creek, and Middle Creek, as shown in blueline on **Figure 1-3**.
- Phase 2 includes several communities as well as unincorporated areas southeast of Prestonsburg, as shown on **Figure 1-4**. Communities include the City of Allen and several towns including Emma, Dwale, Tram, Betsy Layne, and Harold. The Levisa Fork makes up the majority of this study phase, but Mud Creek, Little Mud Creek, Toler Creek, and a small portion of Beaver Creek are also included. In addition, Bannon Branch, Wallace Branch, Mare Creek, and Cow Creek, much smaller Levisa Fork tributaries, are included within the study area.

- Phase 3 includes several communities as well as unincorporated areas south of Prestonsburg, as shown on **Figure 1-5a-c**. The study area runs along the western end of Wayland. It includes only a minor portion within the city limits. The study area runs through the center of Wheelwright, but it does not include the full extent of the city boundaries. Additional communities found along the study area include Minnie, Langley, Garrett, and McDowell. Phase 3 includes Beaver Creek (both Right and Left Fork), Middle Creek (both forks), and Abbott Creek. Clear Creek, Otter Creek, and Arkansas Creek, small tributaries of Beaver Creek, are also part of Phase 3. As stated previously, the City of Martin is not included, as flood damage reduction for that municipal area has been addressed in a separate project.

1.6 Scope of the Study

1.6.1 Project Phasing

The scope of the project described in this detailed project report is limited to reduction of flood damages to structures within Floyd County which would be damaged by a recurrence of the April 1977 flood.

The DPR-1 addresses Phase 1 of the Floyd County flood damage reduction project. Alternatives developed for Phase I include both structural (floodwall) and nonstructural aspects. Phases 2 and 3 of the project will be addressed in subsequent DPRs. At this time, the USACE considers nonstructural measures to be the most appropriate for the Phase II and III areas. This will be re-evaluated and documented during the Phase II and Phase III DPR analyses.

For the purposes of complying with NEPA, this document addresses all three study phases of the project. Alternative measures evaluated for the Phase 1 area include both structural and nonstructural measures as developed in the DPR-1. Alternative measures evaluated for Phase 2 and Phase 3 areas are limited to nonstructural measures. This DEIS looks broadly at the entire county in terms of nonstructural measure implementation and cumulative impacts. The Phase 2 and Phase 3 Supplemental DPR analyses will include supplemental NEPA documentation. If structural measures are included in the Phase 2 and Phase 3 areas, their potential impacts will be evaluated at that time.

1.6.2 Connected, Cumulative and Similar Actions

The CEQ Regulations require “connected actions, cumulative actions, and similar actions” (40 CFR 1508.25) to be considered together in a single EIS.

- *Connected actions* are defined as actions that “automatically trigger other actions, which may require environmental impact statements”, cannot or will not proceed unless other actions are taken previously or simultaneously, or are interdependent parts of a larger action and depend on the larger action for their justification.

- *Cumulative actions*, when viewed with other proposed actions, have cumulatively significant impacts and should therefore be discussed in the same impact statement.
- *Similar actions* are defined as actions which, when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as timing or geography.

No connected or similar actions have been identified with respect to the Proposed Action. The Proposed Action has not been triggered by any other action, nor will it trigger another action requiring an EIS. It is not dependent on another action. The Proposed Action is part of a larger action, i.e., flood damage reduction throughout the Levisa Basin as provided by Congressional Authorization. The various projects, however, including the Proposed Action, are not interdependent. Each could be implemented or not implemented without affecting other actions. The various flood damage control projects within the Levisa Fork and Tug Fork Basins have been studied and implemented on different time schedules and locations and would not be considered similar actions.

Cumulative actions with respect to the Proposed Action are considered to be: the past, current, and reasonably foreseeable future flood control actions within the Levisa Fork Basin; ongoing development within the Levisa Fork Basin; infrastructure and transportation projects; and changes in major industrial activity, including coal mining . These actions and potential cumulative impacts are discussed in Section 6.14.

1.7 Prior Reports and Existing Projects

1.7.1 General Plan

Based upon the Section 202 legislation, the USACE submitted its proposed plans for flood damage reduction measures for the entire Section 202 project area (consisting of the Levisa and Tug Forks of the Big Sandy River Basin and the Upper Cumberland River Basin) to the ASA(CW) in the General Plan dated 28 April 1982. The General Plan summarized the Tug Fork Valley Flood Damage Reduction Plan GDM which evaluated three alternative plans (Plan E-1, F-1, and G-1) for the entire Tug Fork Basin and recommended Plan F-1 for implementation.

The ASA(CW) approved the General Plan with immediate implementation of the Williamson, West Virginia (WV) area structural components of the plan. However, the ASA(CW) reserved approval for the implementation of all remaining plan components dependent upon submittal of future Specific Project Reports (SPR) for each plan increment.

1.7.2 General Planning Memorandum

The Levisa Fork Basin "Draft" General Planning Memorandum was completed in 1986. This report included a detailed formulation and evaluation of both structural and nonstructural measures in the Levisa Fork Basin. This report did not address flooding problems at Grundy, Virginia (VA) (covered by separate report) or Levisa Fork tributary areas experiencing headwater flooding during the April 1977 flood event. Three alternatives were investigated for the Town of Haysi, VA. Two channel modifications and a floodwall alternative for the town were evaluated and dismissed.

1.7.3 General Plan Supplement

The Levisa Fork Basin/Haysi Dam Preliminary Draft General Plan Supplement was completed in May 1995. This report developed a detailed, cost-effective plan to reduce flood damages in Haysi and other communities downstream, including Prestonsburg, KY. The plan included constructing Haysi Dam at river mile (RM)[4] 29.2 of the Russell Fork near the Buchanan/Pike County border. The total plan, including downstream nonstructural measures to supplement the dam, was estimated to cost $652.3 million. The least cost option featured a $105.6 million dry dam at the same location. An alternative featuring a $118.1 million wet dam that included additional storage for downstream whitewater recreation was also developed. Section 353 of the WDRA of 1996 authorized the construction of Haysi Dam for flood control and whitewater recreation. The project has not been constructed due to a lack of non-Federal sponsorship, which is required by WRDA 1986.

1.7.4 Implementation Appendices

Table 1-1 provides a general listing of previous reports prepared as appendices to the General Plan.

This DPR-1, Appendix X, has been prepared to satisfy the SPR requirement for the Floyd County Phase I Project Area increment of the General Plan. The SPR report terminology used in the General Plan was converted to DPR terminology in accordance with CEORD-R 1105-2-4, Section III.

[4] "River mile" is a system of mileage markers on major rivers where a mile is measured along the center line of the river. River mile 0.0 is at the mouth of the river.

Table 1-1. Implementation Appendices to the General Plan

REPORT	DATE	TITLE
Appendix A	April 1982	Formulation of Defined Program
Appendix B	April 1982	Implementation Schedule
Appendix C	April 1982	Budget Constrained Implementation Schedule
Appendix D	April 1982	Pikeville, KY Project Summary
Appendix E	April 1982	Pikeville, KY Project Summary (Pikeville Gate Closure)
Appendix F	April 1982	Williamson, WV Area Project Summary (West Williamson Floodwall/Williamson Central Business District Floodwall/ Snagging and Clearing)
Appendix G	December 1983	Barbourville, KY Levee Project Summary
Appendix H	May 1985	Matewan, WV Area Structural (S)/Nonstructural (NS) Project Summary SPR
Supplement to Appendix F	January 1985	Williamson, WV NS Project SPR
Appendix I	N/A	Untitled
Appendix J	January 1986	Upper Slate Creek (Grundy, VA) SPR (Terminated/Incorporated Appendix O)
Appendix K	January 1986	South Williamson, KY S/NS Project Summary SPR
Appendix L	February 1990	Lower Mingo County, WV SPR
Appendix M	September 1991	Hatfield Bottom (Matewan, WV) DPR
Appendix N	October 1993	Pike County, KY DPR
Appendix O	August 1993	Grundy, VA DPR
Appendix P	February 1995	Upper Mingo County, WV DPR
Appendix Q	July 1996	Martin County, KY NS Project DPR
Appendix R	January 1997	Wayne County, WV DPR
Appendix S	May 1998	McDowell County, WV DPR
Supplement to Appendix P	September 1998	Upper Mingo County, WV NS Project Supplement
Appendix T	March 2000	“Town of Martin”, KY DPR
Supplement to Appendix N	March 2002	Pike County, KY Tributaries, NS Supplement
Appendix U	January 2002	Buchanan County, VA DPR
Appendix V	August 2003	Dickenson County, VA DPR
Appendix W	March 31, 2004	Pike County, Kentucky, Levisa Fork Basin, Flood Damage Reduction Project DPR
Appendix X		**Floyd County, Kentucky Levisa Fork Basin, Flood Damage Reduction Project DPR-1, Prestonsburg And Lower Levisa Fork and Floyd County Draft Environmental Impact Statement (DEIS) Section 202 Flood Damage Reduction** * *This Document

1.7.5 Levisa Fork Basin Projects Overview

Five USACE flood control dams were constructed on the Levisa Fork or its tributaries prior to the April 1977 flood. Each of these reservoirs was constructed for multiple purposes including flood control, water-supply, low-flow augmentation, and recreation. These five reservoirs (John W. Flannagan Dam and Reservoir, Fishtrap Lake, North Fork of Pound River Lake, Dewey Lake, and Paintsville Lake) reduced basin-wide flood damages from the April 1977 flood by about $455.4 million (Oct 1999 price level). The Haysi Dam project at RM 29.2 of the Russell Fork was authorized for flood control and recreation in Section 353 of WRDA of 1996. Haysi Dam would be located above the project area and would provide flood damage reduction for portions of the project area if it were built. The John W. Flannagan Dam and Reservoir and the North Fork of Pound River Lake are located upstream of the project area in the Russell Fork basin. They provided flood damage reduction in the project area in April 1977 for structures on the Russell and Levisa Forks.

1.7.5.1 <u>Levisa Fork Basin Structural Projects</u>

The North Fork of Pound River Lake was authorized by the Flood Control Act of 1960 (PL 86-645) and completed in January 1966. The reservoir provides minimum winter flood control storage of 9,300 acre-feet and summer flood control storage of 8,100 acre-feet with a maximum surface area of 349 acres.

The John W. Flannagan Dam and Reservoir was authorized by the Flood Control act of 1938 (PL 75-761) as amended by the Federal Water Pollution Control Act, Amendments of 1961 (PL 87-88) and completed in December 1963. The reservoir provides minimum winter flood control storage of 94,700 acre-feet and summer flood control storage of 78,200 acre-feet with a maximum surface area of 2,098 acres.

Fishtrap Lake was authorized in the Flood Control Act of 1938 (PL 75-761) and completed in February 1969. The reservoir provides minimum winter flood control storage of 153,800 acre-feet and summer flood control storage of 126,600 acre-feet with a maximum surface area of 2631 acres.

Dewey Lake was authorized in the Flood Control Act of 1938 (PL 75-761) and placed in operation in July 1949. The reservoir provides winter flood control storage of 81,000 acre-feet and summer flood control storage of 76,100 acre-feet with a maximum surface area of 3,340 acres.

Paintsville Lake was authorized in the Flood Control Act of 1965 (PL 89-298) and placed in operation in September 1983. The reservoir provides flood control storage of 32,800 acre-feet with a maximum surface area of 1,861 acres.

The Pikeville Cut-Through Project was constructed under the Appalachian Regional Commission's Model Cities Program, with USACE technical and construction management assistance, during the 1973 - 1987 period. The project created a ¾-mile channel through Peach Orchard Mountain to bypass a section of the Levisa Fork which frequently flooded Pikeville. The Cut-Through re-routed the Levisa Fork with the now dry former stream route providing a path for railroad tracks and US Highways (US) 23, 460, 119, and KY 80. The abandoned Levisa Fork channel adjacent to Pikeville was filled with spoil from the cut-through to create developable land for economic improvement. Two flood gates were installed after the April 1977 flood to prevent backwater flooding from the Levisa Fork.

1.7.5.2 Levisa Fork Nonstructural Projects

The Grundy, VA component (Appendix O) of the Section 202 program is currently in the implementation phase and was the first approved nonstructural project in the Levisa Fork basin. Total project cost is estimated to be $101.6 million with a Federal share of $72.3 million and non-Federal share of $29.3 million. The project includes 48 structures eligible for floodproofing, 48 voluntary acquisitions, 69 mandatory acquisitions for associated the US 460 improvement, construction of a flood-safe commercial redevelopment site, and protection of 17 structures by ringwall/levee. The non-Federal co-sponsors are the town of Grundy and the Virginia Department of Transportation.

The “Town of Martin” component (Appendix T) was approved in March 2001 and is currently being implemented. The plan calls for floodproofing of eight residential and four nonresidential structures, floodplain evacuation of 116 residential and 85 nonresidential structures, and development of residential and commercial redevelopment sites. Total project cost for the “Town of Martin” Nonstructural Project is estimated to be $97,500,000 (fully funded) and will be carried out over a ten-year implementation period. The Floyd County Fiscal Court serves as the non-Federal sponsor for the project.

The Buchanan County, Virginia component (Appendix U) of the Section 202 Program has been approved by Headquarters of the USACE (HQUSACE) and can be implemented following Project Cooperation Agreement (PCA) approval, appropriation of Federal funds, and receipt of the non-Federal matching funds. The total project cost is estimated to be $118.6 million with a federal share of $112.7 million and a non-Federal share of $5.9 million. The project includes 730 structures eligible for voluntary floodproofing or acquisition and will be implemented over a six year period. The non-Federal sponsor is Buchanan County.

The Dickenson County component (Appendix V) of the Section 202 program is was approved on July 3, 2004. The PCA was signed on January 6, 2006. The plan calls for floodproofing 71 residential, 17 nonresidential, and 1 public structures; floodplain evacuation of 91 residential and 37 nonresidential structures; and relocating 16 public structures. The total project cost for the Dickenson County Nonstructural Project is estimated to be $103.8 million (fully funded) and will be carried out over a nine year period. The Dickenson County Board of Supervisors will serve as non-Federal sponsor for the project.

The Levisa Fork Flood Warning System project includes installation of eleven stream gages and nine computer workstations. Two of the stream gages are located in Pike County (Pikeville and Elkhorn City) and computer stations are located in Pikeville and

Elkhorn City. This equipment was designed and installed in December 2000. The Pikeville gage was upgraded for this project and is maintained by an existing agreement between the USACE and U.S. Geological Survey (USGS). The Elkhorn City gage was installed for this project and is maintained by agreement with the Kentucky Division of Emergency Management. Nine existing rain gages are also operational in Pike County's Levisa Fork watershed. The Integrated Flood Observing and Warning System (IFLOWS) communications system is maintained by the Virginia Department of Emergency Services, the Kentucky Division of Emergency Management, and the National Weather Service. The system is designed to provide a basin-wide detection and notification system.

1.8 Project Sponsorship

The Floyd County Fiscal Court, as the non-Federal sponsor, and the USACE, Huntington District initiated this Floyd County DPR-1 feasibility study in 2000. The Floyd County Fiscal Court will also sponsor the DPR-2 and DPR-3 feasibility studies.

1.9 Decision to be Made

This DPR-1/DEIS identifies least-cost alternative, the environmentally-preferred alternative, the locally-preferred alternative, and the USACE's preferred alternative plan. The DPR-1/DEIS public review period will allow public and agency review and comment in accordance with Federal regulations. The USACE will give full consideration of comments and document these considerations in the DPR-1/Final EIS (FEIS). The DPR-1/FEIS will identify USACE's selected alternative plan.

CHAPTER 2. PURPOSE AND NEED

The purpose of agency action is to provide flood damage reduction measures to protect residents and properties within the floodplain of the Levisa Fork and its tributaries within Floyd County, KY. Agency action is needed to comply with Federal legislation as detailed in Section 1.3, in order to limit loss of life and property within the study area from future flood events.

2.1 Problems

The recurring floods that characterize the Levisa Fork Basin result in loss of life, property damages, lost business revenues, lost school days, and shrinking tax revenues.

Since the earliest Levisa Fork Basin settlements, the residents faced the problem of frequent and severe flooding. Streams, in Floyd County as well as other Appalachian areas, frequently undergo extreme flow fluctuations resulting in overbank flooding and inundation of cultural development in the floodplains.

Various factors contribute to the frequency of flooding in the project area. The steep mountainous terrain in conjunction with large land areas of shallow forest soils is conducive to excessive rates of runoff. Forest clearing for resource extraction also contributes to excessive runoff. Development in the narrow floodplain and addition of impermeable surfaces add to the high rates of stormwater runoff and contribute to increased flood events. Frequent and rapid weather changes occur due to the passages of frontal systems associated with general low-barometric pressure areas. The occasional stagnation and stationary nature of these frontal systems sometimes causes prolonged precipitation, leading to stormwater runoff in excess of stream channel capacities (USACE 1998a[5]).

The terrain bordering the floodplain is very mountainous and much of it is owned by land holding companies. Since corporate ownership limits private development outside of the floodplain, the majority of the level, developed land is located in flood hazard areas along the narrow floodplains.

Consequently, the vast majority of floodplain communities and other cultural improvements are threatened by recurring floods, a situation that is likely to continue unless there is intervention. Major floods in Floyd County occurred in 1862, 1918, 1929, 1939, 1955, 1957, 1963, 1967, 1977, 1984, and 2003.

Emergency and recovery costs from the recurring flooding drain county and state resources. Loss of residential structures and businesses due to flooding further strains the tax base of the county, making recovery more difficult with each event.

---

[5] References cited appear abbreviated in parentheses in the text. Refer to Chapter 9 for a list of references.

In addition to the severe financial losses caused by frequent flooding, there are adverse social, physical, and psychological effects on the human population. The threat to life due to drowning during flood events lingers in the minds of all those in the floodplain. The prospect of future flooding discourages proper maintenance and repair of buildings and investment in such property by lending institutions. This in turn causes early deterioration of dwellings and business structures and helps account for a large number of floodplain structures not considered to be decent, safe and sanitary (DSS).

Often the floods sever access to a community or neighborhood, effectively isolating elements of the population. However, floods in this region are typically of short duration. During extreme events, human lives are often negatively impacted when common utilities such as water, gas, and electricity are lost for days. Subsequent impacts to local economies due to business closures and loss of taxable property can further strain a community's ability to recover from repetitive flooding. All of this results in significant trauma and hardship for the people residing in and around the area and reinforces their strong concern and interest in developing and implementing effective flood damage reduction measures.

The April 1977 storm system resulted in a series of heavy rainfalls over a 72-hour period in Dickenson and Buchanan Counties, VA and portions of Pike County, KY. The aggregation of these floodwaters began to reach its peak in the floodplains of Pike and Floyd Counties, KY.

A recurrence of the April 1977 flood would result in damages to over 4,770 structures in the Levisa Fork basin, approximating $282 million in 2004 dollars. In addition to structural damages, flooding damages to transportation facilities within the Levisa Fork basin would approach approximately $10.8 million in 2004 dollars. Additional damages to infrastructure such as sewage and water treatment facilities, airports, substations, and railroads, have not been quantified. Floyd County would incur $133 million in damages (2004 dollars).

Most of the riverbank along the City of Prestonsburg is near the elevation corresponding to a one percent chance[6] event. Flooding occurs when the rising water breaks over at low points. The lowest point along the river bank within the City of Prestonsburg is in the Blackbottom neighborhood at elevation 629 feet above mean sea level (AMSL). Flood waters move from this area into downtown Prestonsburg.

Within the DPR-1 area, estimated damages for a one percent chance event and a 0.2 percent chance event are shown in **Chart 2-1.** A simulation of the 1977 flood in downtown Prestonsburg is shown in **Photo 2-1**.

[6] Commonly referred to as the 100-year frequency flood. A flood event that statistically has a 1 out of 100 (or one percent) chance of being equaled or exceeded on a specific watercourse in any given year.

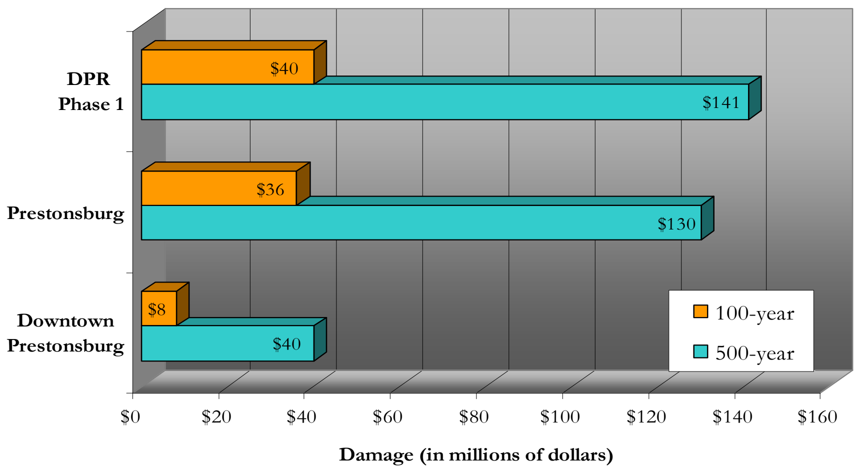


Chart 2-1. Estimated Flood Damage within DPR Phase 1 Area

Photo 2-1. Simulated Recurrence of 1977 Flood in Prestonsburg, Kentucky

2.2 Opportunities

The purpose of the proposed Levisa Fork (Floyd County, KY) Flood Damage Reduction Project is to reduce financial and personal losses, and social and economic disruptions within the Levisa Fork Basin as defined in Section 2.1 above. Solving these persistent problems could provide opportunities for improving other aspects of communities in the project area. The purpose of this DPR-1 feasibility study is to identify the least-cost plan for reducing damages.

Years of deferred maintenance, due to recurring flood damages, could be reversed provided that recurring damages could be reduced or eliminated. A flood damage reduction project, if found feasible, may result in improvements to local housing quality and commercial development that would stabilize the county’s property tax base. Construction of a floodwall that protects a commercial/financial center also encourages additional investment in buildings and plant facilities. Implementation of floodproofing and permanent floodplain evacuation measures would reduce flood damages and provide the following opportunities:

- upgrading of housing stock through demolition of deteriorated floodplain units and rehabilitation or construction of new units
- clearing floodways that would result in reductions of the 100-year frequency flood elevation for surrounding structures and facilities
- clearing floodways that would allow riparian and bottomland habitat resources to be restored through undisturbed vegetation growth
- upgrading structures to be floodproofed
- decreasing water quality degradation by requiring upgraded sewerage systems in floodproofed structures and removal of floodway structures
- reducing floatable debris through removal of floodplain structures and the material stored in them

2.3 Public Concerns

2.3.1 Scoping

Public participation is a significant component of the NEPA process. The USACE carefully considers public comments before making a decision. This section summarizes key public notification and participation events that have occurred as part of this process, and summarizes key issues identified during the public scoping process for this DPR-1/EIS.

A Notice of Intent (NOI) to prepare an EIS was given to the public and was published in the *Federal Register* on October 30, 2003 (Volume 68, Number 210, Page 61793), thereby initiating a 60-day period for input on the proposed action and alternatives.

Notices advertising this action to the local public were also published in the Appalachian News Express and the Lexington Herald-Leader.

Federal, state, and local input was also sought through a combination of consultation meetings and correspondence. Letters requesting information about the project area and environmental resources were sent to Federal, state, and local agencies. An on-site project scoping meeting was conducted on June 29, 2004 with representatives of the US Fish and Wildlife Service (USFWS), Kentucky Department of Fish and Wildlife Resources (KDFWR), and Kentucky Division of Water (KDOW). Ongoing consultation with the Kentucky Heritage Council, which is the State Historic Preservation Office (SHPO), has resulted in a memorandum of understanding regarding cultural resources within the study area. In addition, numerous meetings have been held with local officials, property owners, and local businesses. A summary of scoping activities with agencies and officials is included in **Annex A.**

Two public scoping meetings were held in order to receive public comments on the proposed actions and to assist in defining the scope of analysis. The meetings were held at the Prestonsburg High School on November 13, 2003 and March 9, 2004. Comments received during the scoping process are included in Annex A. Community surveys were conducted as part of the socioeconomic impact and community cohesion analyses.

2.3.2 Issues of Public Concern

The evaluation of public concerns reflects a range of needs perceived by the public. The existing problems and opportunities that have been identified are:

- Property values are lower because of recurrent flooding.
- Costly flood insurance is required for many properties. Alternative plans can provide opportunity for economic relief to property owners through reduction or elimination of flood insurance.
- There is an opportunity for increased property values, both from reduced risk of flooding and from property improvements made by owners once the flood risk is reduced.
- The City of Prestonsburg has a combined stormwater/wastewater system. This combined system provides inadequate stormwater drainage during high events and flash floods, and helps cause frequent flooding in Prestonsburg. The combined system also allows untreated sewage to be released into the Levisa Fork during periods of high precipitation. Alternative plans that facilitate separation of stormwater and wastewater would also provide opportunity to reduce flood damage and improve surface water quality in the Levisa Fork.

During the scoping process, concerns were also identified with respect to potential flood damage reduction measures. Concerns include:

- the potential for relocation

- impacts to property values
- loss of community cohesion
- induced flooding
- hardship
- impacts to streams, including the Levisa Fork
- impacts to viewshed
- access to the Levisa Fork

2.4 Planning Constraints

Unlike planning objectives that represent desired positive changes, planning constraints represent restrictions that must not be violated. Planning constraints identified in this study are described in this section.

2.4.1 Funding

In accordance with the authority for the project contained in Section 202 of the Energy and Water Resources Development Appropriations Act of 1980 (P.L. 96-367), a benefit to cost ratio exceeding one is not required for the Floyd County project. Uncertainties associated with the funding may constrain the flow of annual funds that may be applied to the planning process in any one year. For this reason, the DPR planning process has been divided into three manageable phases for Floyd County.

2.4.2 Floodplain Regulations

Floyd County joined the National Flood Insurance Program (NFIP) on September 5, 1984. The NFIP is a Federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for floodplain management regulations that reduce future flood damages. Participation in the NFIP is based on an agreement between communities and the Federal Government. If a community adopts and enforces a floodplain management ordinance to reduce future flood risk to new construction in floodplains, the Federal Government will make flood insurance available within the community as a financial protection against flood losses. This insurance is designed to provide an insurance alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods. Community participation in the NFIP is voluntary. Federal Emergency Management Agency (FEMA) estimates that – taken as a whole – buildings constructed in compliance with NFIP building standards suffer approximately 80 percent less damage annually than those not built in compliance (FEMA, 2002).

Under the NFIP regulations, participating NFIP communities are required to regulate all development in areas defined by FEMA as Special Flood Hazard Areas (SFHA). “Development” is defined as:

> *"any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials."*

Before a property owner can undertake any development in the SFHA, a permit must be obtained from the community. The community is responsible for reviewing the proposed development to ensure that it complies with the community's floodplain management ordinance. Communities are also required to review proposed development in SFHAs to ensure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, such as 404 wetland permits from the USACE or permits under the Endangered Species Act (ESA).

Within the City of Prestonsburg, floodplain requirements are included in Article III, General Requirements and Minimum Design Standards of the Prestonsburg Subdivision Regulations and Zoning Ordinance, effective March 22, 1999. In areas subject to flooding conditions, a subdivision is permitted only if flood-free housing sites can be provided. The Planning Commission may require special provisions and controls to assure healthful, safe housing sites in such areas. Developers must check with other City Ordinances to insure compliance with the NFIP requirements. (If compliance is not met, financing of the structure may be impossible from Federally-insured lending institutions.)

2.4.3 Federal Statutes, Regulations, and Executive Orders (EO)

The project must be in compliance with the applicable Federal Statutes, Regulations, and EOs regarding environmental protection. These various requirements and the project's compliance with them are listed below. In addition, a summary of environmental commitments made and proposed mitigation for anticipated project impacts is included as Table 4-11.

- **National Environmental Policy Act of 1969, as amended (42 USC 4321 et seq.), the Council on Environmental Quality Implementing Regulations (CFR 1500 et seq.).** NEPA requires Federal agencies to study the potential impacts to the natural and human environment of major Federal Actions.

  The project alternatives were formulated in consideration of potential environmental impacts in order to comply with NEPA. Public participation and agency review are also in compliance with NEPA.

- ***Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as amended (PL 91-646, 42 USC §4601 et seq.)** The Uniform Relocation Assistance and Real Property Acquisition Policies Act established guidelines to provide compensation for owners and occupants of property and houses affected by Federal projects.

  Owners and occupants of property and houses that must be acquired and removed to construct the project would be compensated according to the guidelines established by this Act. Implementation requirements in Section 4.7 of this *document specify responsibilities of the Federal and non-Federal sponsor for compliance.*

- **Clean Air Act (CAA), as amended (42 USC 7401 et seq.)** The CAA establishes National Ambient Air Quality Standards (NAAQS) set by the U.S. Environmental Protection Agency (USEPA) for certain pollutants (i.e., carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide). The standards are set at a level designed to protect human health with a conservative margin of safety. Regulations implementing the CAA are found in 40 CFR Parts 50-95.

  Floyd County is designated in 401 KAR 51:010 as "In Attainment" for all NAAQS criteria pollutants, and a written General Conformity Determination is not required for this Proposed Action.

- **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 / Superfund Amendments and Reauthorization Act of 1986, as amended (42 USC 9601 et seq.)** This statute requires cleanup and notification if there has been a past release or threatened release of a hazardous substance in the project area.

  Implementation requirements in Section 4.7 of this document specify responsibilities of the Federal and non-Federal sponsor in investigating and funding cleanup for discovered sites under CERCLA. Procedures for compliance during project implementation are described in Sections 6.11.3-5.

- **Occupational Safety and Health Act (OSHA) of 1970, as amended (29 USC 651 et seq.)** OSHA's mission is to assure the safety and health of America's workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in workplace safety and health.

  Contractors implementing this project would be required to comply with the Occupational Safety and Health Act construction and general industry rules in 29 CFR Parts 1910 and 1926. Operational employees would be instructed in worker protection and safety procedures, and would be provided appropriate personal protective equipment. Construction workers who would be subjected to the highest noise levels would follow standard USACE and OSHA requirements to prevent hearing damage.

- **Clean Water Act (CWA) of 1977 as amended (33 USC 1251 et seq.)** The CWA provides a framework of standards, technical tools, and financial assistance to improve water quality in the United States. It addresses causes of poor water quality and pollution, such as municipal and industrial wastewater discharges, and urban and rural runoff. Section 404 of the CWA establishes a program to regulate the discharge of dredged and fill material into waters of the U.S., including wetlands. Activities in waters of the U.S. that are regulated under this program include fills for development, water resource projects, infrastructure development, and conversion of wetlands to uplands for farming and forestry. A Federal permit is required to discharge dredged or fill material into wetlands or other waters.

The USACE follows the procedures of Section 404 but does not permit its own project. The Commonwealth of Kentucky would be responsible for issuing a Water Quality Certification (WQC) under Section 401 of the CWA for this project.

Proposed mitigation for impacts to streams within the project area is discussed in Section 6.8.6. The USACE is proposing to use in-lieu fee to mitigate impacts to tributary streams. The total in-lieu fee compensatory mitigation cost for tributary streams would be approximately $327,974 for Alternative Plan 2 and $137, 979 for Alternative Plan 3. The intent is to conduct mitigation projects as close to the impact site as possible. The policy of the USACE and the KDFWR is that mitigation projects occur in the same river basin and ecological region. For example, an impact in the Big Sandy River Basin in the Appalachian region of Kentucky would be mitigated by an in lieu fee project in this same basin and region.

Both mitigation-in-place and in-lieu fee compensation are still being considered for the Levisa Fork. The mitigation-in-place option for the Levisa Fork would incorporate measures to improve aquatic habitat in the areas disturbed by streambank stabilization. A detailed mitigation plan will be included in the Final EIS. A CWA 404(b)(1) analysis is included as Annex 3 to this document.

- **Floodplain/Wetlands Environmental Review Requirements.** EO 11988, Floodplain Management, directs Federal Agencies to establish procedures to ensure they consider and minimize potential effects of flood hazards and floodplain management for any action undertaken. EO 11990, Protection of Wetlands, requires Federal agencies to avoid short- and long-term impacts to wetlands if a practical alternative exists.

  Implementation requirements in Section 4.7 of this document specify responsibilities of the Federal and non-Federal sponsor for compliance with EO11988. The alternatives in this document were developed to consider and minimize effects on floodplains, and the project would have a beneficial effect on the floodplain of the Levisa Fork within the project reach. One wetland is within the project limits of Alternative Plan 2, in an area designated for temporary storage of interior drainage during flood events. This would be a beneficial impact, as discussed in Section 6.8.4.5.

- **Endangered Species Act of 1973 as amended (16 USC 1531 et seq.)** Section 7 of the ESA, “Interagency Cooperation”, requires Federal Agencies authorizing, funding, or carrying out any action to ensure that the action is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species.

  The project as described has the potential direct, adverse impact to summer roosting and foraging habitat for the Indiana bat. The USACE, in consultation with the USFWS and KDFWR, plans to conduct needed clearing activities during winter months (November 15 through March 31) to avoid potential direct impact (i.e., injury) to the Indiana bat. If tree removal would be required outside of this time frame, the USACE will coordinate *with the USFWS and KDFWR to ensure the necessary precautions are implemented to avoid impact to the Indiana Bat.*

- **Farmland Protection Policy Act (FPPA) of 1981, as amended (7 USC 4202(a)**). This law applies to Federal actions and assistance that would convert important farmland to nonagricultural use. Important farmlands are those with soils designated as prime and unique or of statewide and local importance. The FPPA goal is to minimize Federal Programs' contribution to farmland conversion.

  The project will not convert important farmland to nonagricultural use. A prime farmland conversion impact rating is included in Annex A.

- **Fish and Wildlife Coordination Act, as amended (16 USC 661 et seq.)** The legislation authorizes the Secretary of the Interior, through the USFWS to assist and cooperate with Federal, state and public or private agencies and organizations in the conservation and rehabilitation of wildlife. This Federal statute requires consultation for the possible effects on wildlife if there is construction, modification, or control of bodies of water in excess of 10 acres in surface area. The agencies' reports and recommendations are to be included in authorization documents for project construction or modification. The USACE is required to give full consideration to these reports and recommendations, and include wildlife mitigation or enhancement required to obtain maximum overall project benefits.

  Continued coordination and informal collaboration with the USFWS has resulted in a detailed understanding of the existing habitat and potentially adverse impacts to both aquatic and terrestrial resources in the Levisa Fork basin within the proposed study area. The analysis and interpretation of this information has allowed for productive discussion and significant progress toward developing mitigation measures to compensate for ecological impacts of the preferred alternative. Coordination with USFWS and state regulatory agencies is ongoing. A Fish and Wildlife Coordination Act Report will be included in the FEIS.

- **National Historic Preservation Act (NHPA) of 1966, as amended (16 USC 470 et seq.)** This Federal statute requires the USACE and other Federal Agencies to consult with the SHPO prior to construction to determine the project's effect on historical properties and to avoid, minimize, or mitigate impacts.

  The USACE has previously determined that the proposed project would affect properties included in or eligible for inclusion in the NR and has consulted with the ACHP and the Kentucky SHPO, pursuant to the regulations (36 CFR Part 800) implementing Section 106 of the NHPA. Cultural resources, including archaeological resources and historic/architectural resources, could be directly and indirectly affected by the proposed project. Based on the history of the area summarized in Section 5.10, the proximity of the Levisa Fork, and the number of existing historic sites and artifacts found during previous investigations, a relatively high potential exists that previously unrecorded archaeological sites would be identified during site investigations.

  To ensure full consideration of potential impact to cultural resources, a Programmatic Agreement has been developed between the USACE, Huntington

District and the Kentucky SHPO regarding this and other Section 202 Flood Reduction activities within the Levisa Fork basin. The agreement covers activities in Pike, Johnson, Lawrence counties as well as Floyd County, Kentucky. This Programmatic Agreement, dated March 2003, is included in Annex A. The Programmatic Agreement sets forth the agreed-upon procedures the USACE would follow prior to implementation of a selected alternative in order to satisfy USACE's Section 106 responsibilities for all individual project undertakings.

- **Wild and Scenic Rivers Act of 1968, as amended (16 USC 1271 et seq.)** This Act protects selected national rivers possessing outstanding scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values. These rivers are to be preserved in a free-flowing condition to protect water quality and for other vital national conservation purposes.

  No Wild or Scenic Rivers are located within the proposed project limits, and none would be affected by implementation of this project.

- **Rivers and Harbors Act of 1899, as amended (33 USC 403).** Section 9 of this Act prohibits the construction of any bridge, dam, dike, or causeway over or in navigable waterways of the US without Congressional approval. Administration of Section 9 has been delegated to the Coast Guard. Section 10 is administered by the USACE and covers construction, excavation, or deposition of materials in, over, or under such waters, or any work which would affect the course, location, condition, or capacity of those waters. The USACE follows the procedures of Section 10 but does not permit its own project.

  The Levisa Fork is considered a navigable waterway only from its mouth to mile 130.0 (Louisa, KY to Virginia state line near Toonerville, KY). Compliance with this law will be attained in conjunction with CWA compliance. A CWA 404(b)(1) analysis is included as Annex C of this document.

- **Federal Water Project Recreation Act of 1965, as amended (16 USC 4601-12 et seq.)** This Act states that Federal agencies must consider potential outdoor recreational opportunities and potential fish and wildlife enhancements when planning navigation, flood control, reclamation, hydroelectric, or multipurpose water resource projects.

  The USACE has considered incorporation of recreational opportunities and fish and wildlife enhancement where possible during the development of alternatives. Section 6.8.6 describes the ecological mitigation plan, which would benefit fish and wildlife. Recreational opportunities incorporated into the plan are described in Section 6.10.4. The project would have an overall benefit to recreation by improving the quality of the riparian corridor of the Levisa Fork along the project reach.

- **Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks (April 21, 1997)** EO 13045 is intended to prioritize the identification and assessment of environmental health risks and safety risks that may affect children and to ensure that Federal agencies' policies, programs, activities, and standards address environmental risks and safety risks to children.

For both Alternative Plan 2 and 3, the Prestonsburg High School would be located adjacent to a construction staging area, the floodwall, a pump station, and ponding area. With Alternative Plan 2, the BSCTC would be adjacent to a construction staging area, the floodwall, a pump station, and ponding area. Increased dust, noise and vibration would be expected during construction, as described in Sections 5.6 and 5.7. Mitigation measures for air quality and noise impacts are discussed in Sections 6.5 and 6.6. The potential for children to access construction areas would be controlled through construction site supervision and security practices. Access to the pump station would be prevented by fencing, locked gates and security doors.

- **Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994)** EO 12898 requires Federal agencies to identify and address, as appropriate, disproportionate and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

  As discussed in Section 6.10.6, no differences in environmental justice issues are expected from the construction and operation of any of the alternatives. None of the described alternatives would adversely or disproportionately affect members of minority populations because the minority populations are not concentrated in the implementation area and are not meaningfully greater in the implementation area than in the general Floyd County and Kentucky populations. The structural features would not adversely or disproportionately affect members of minority populations. There would be no disproportionate impact to low-income populations. All displaced persons, regardless of race or income level, would be compensated for moving expenses and replacement housing in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (PL 91-646), as amended.

2.4.4 Kentucky Environmental Statutes and Regulations

The project must also be in compliance with the applicable Kentucky Statutes and implementing regulations regarding environmental protection. Statues and regulations are listed below:

- **Kentucky Water Resources Standards (Kentucky Revised Statutes (KRS) 224.70-71) –** KRS 224.70-71 provides for the water quality programs in Kentucky. Water quality is regulated under 401 Kentucky Administrative Regulations (KAR) 4-8.

  Compliance with state water quality requirements would be achieved in conjunction with Federal compliance (see Section 2.3.3).

- **Kentucky Waste Standards (KRS 224.70-71) –** Chapter 224 Environmental Protection, Subchapters 40 (Waste – Generalities), 43 (Solid Waste), 46

(Hazardous Waste), 50 (Other Specific Types of Waste) and 60 (Underground Storage Facilities) provide for waste management requirements in Kentucky.

Compliance with state waste management requirements would be achieved in conjunction with Federal compliance (see Section 2.3.3).

- **Kentucky Air Quality Standards (KRS 224.20) –** KRS Chapter 224 Subchapter 20 (KRS 224.20) provides for the air quality program in Kentucky. Air quality is regulated under Title 401 KAR Chapters 50-65 (401 KAR 50-65).

  Construction would be performed in accordance with the State Implementation Plan, and in compliance with applicable Kentucky Division for Air Quality requirements. This is discussed in Section 6.5.

CHAPTER 3. STUDY OBJECTIVES

This chapter presents the establishment of planning objectives, which is the basis for the formulation of alternative plans.

3.1 National Objectives

The National, or Federal, objective of water and related land resources planning is to contribute to national economic development (NED) consistent with protecting the nation's environment. Contributions to NED are increases in the net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct net benefits that accrue in the planning area and the rest of the nation.

Congress added a second national objective for Ecosystem Restoration in the WRDA of 1986 and subsequent WRDA legislation. This objective is to contribute to the nation's ecosystems through ecosystem restoration, with contributions measured by changes in the amounts and values of habitat. Because the Section 202 program authority does not include ecosystem restoration, this document does not identify a specific National Ecosystem Restoration (NER) plan. However, the USACE Environmental Operating Principles discussed below in Section 3.2 apply to this Program and project.

3.2 NEPA Objectives

NEPA established a national environmental policy and goals for the protection, maintenance and enhancement of the environment. It also provides a process for implementing these goals within Federal agencies. NEPA requires all Federal agencies to incorporate environmental considerations in planning and decision-making. NEPA also established the President's Council on Environmental Quality and empowered it to develop regulations by which all Federal agencies would comply with NEPA. These regulations are published in 40 CFR 1500-1508.

The USACE has promulgated its own procedures to provide guidance for the procedural provisions of NEPA. These procedures are published as USACE ER 200-2-2 (33 CFR Part 230). ER 200-2-2 is used in conjunction with the CEQ regulations. Specific guidance for planning USACE Civil Works water resource projects is also provided in ER 1105-2-100.

The NEPA Regulations establish a process is set forth where all agencies must assess the environmental impact of proposed Federal actions and consider reasonable alternatives to their proposed actions. For those actions with the greatest potential to create significant environmental effects, the consideration of the proposed action and alternatives are presented in an EIS.

The USACE Environmental Operating Principles provide an approach to implementing NEPA that integrates the concept of environmental sustainability into the protection of the human and natural environment. The seven principles are:

1. Strive to achieve environmental sustainability. An environment maintained in a healthy, diverse, and sustainable condition is necessary to support life.
2. Recognize the interdependence of life and the physical environment. Proactively consider environmental consequences of USACE programs and act accordingly in all appropriate circumstances.
3. Seek balance and synergy among human development activities and natural systems by designing economic and environmental solutions that support and reinforce one another.
4. Continue to accept corporate responsibility and accountability under the law for activities and decisions under USACE control that impact human health and welfare and the continued viability of natural systems.
5. Seek ways and means to assess and mitigate cumulative impacts to the environment; bring systems approaches to the full life cycle of USACE processes and work.
6. Build and share an integrated scientific, economic, and social knowledge base that supports a greater understanding of the environment and impacts of USACE work.
7. Respect the views of individuals and groups interested in USACE activities, listen to them actively, and learn from their perspective in the search to find innovative win-win solutions to the nation's problems that also protect and enhance the environment (USACE 2003b).

In accordance with ER-200-1-5 and USACE Environmental Operating Principles, the USACE has incorporated environmental considerations throughout the decision-making process. The information gathered during the development of this DEIS has led to changes in project design, incorporation of environmental mitigation measures and provided an opportunity for the public and resource agencies to provide input into the planning process. This process has also allowed the USACE to address compliance with other environmental laws as part of a single review rather than through separate reviews, thereby reducing paperwork while ensuring comprehensiveness.

3.3 Planning Objectives

In addition to the broad National objectives discussed above, the USACE developed specific objectives for the Floyd County project. The primary planning objective is to formulate the most cost effective, socially acceptable, and environmentally sound project alternatives to reduce financial and personal losses, and social and economic disruptions due to flooding.

Based upon the identified problems and opportunities within the Floyd County Project area, local desires, and the intent of the aforementioned project authorization, the USACE has identified the following planning objectives of this study;

Planning Objective 1: Develop the most cost-effective, implementable plan that provides the mandated flood protection, complies with Section 202 of PL 96-367 and satisfies other applicable laws and regulations.

Planning Objective 2: Reduce, to the extent possible, financial and personal losses due to flooding.

Planning Objective 3: Maintain, to the extent possible, the social and cultural resources of the area.

Planning Objective 4: Minimize, to the extent possible, the social and economic disruptions due to project construction and mandatory relocation.

Planning Objective 5: Develop the most socially acceptable and environmentally sound plan.

CHAPTER 4. ALTERNATIVES

4.1 Plan Formulation Rationale

4.1.1 Specific Local Concerns

As presented in Section 2.2.2, specific local concerns have been identified. Concerns of particular issue when developing flood damage reduction plans include:

- the potential for relocation
- impacts to property values
- loss of community cohesion
- induced flooding
- hardship
- impacts to streams, including the Levisa Fork
- impacts to viewshed
- access to the Levisa Fork

4.1.2 General Plan Alternatives

The 1986 General Plan considered a number of alternative measures for alleviating the flooding problem in the project area. These measures included both engineered and management measures, as well as structural and nonstructural measures. Geography, land use pattern, land ownership, severity of flooding, and locations of project area floodplain development constrain the array of feasible alternatives.

4.1.3 Level of Protection

The basin-wide target level of protection is the higher of either the April 1977 flood levels or the one percent chance flood. This ensures consistency with the NFIP, which requires flood insurance for structures not protected for at least the one percent chance flood. Within Floyd County, the one percent chance flood is of a higher magnitude than the 1977 flood event, and therefore, the one percent chance flood event was set as the minimum level of protection.

The Fiscal Year 1982 Supplemental Appropriations Act (PL 97-257) directed that “high levees and floodwalls” in urban areas provide for SPF level of protection "where the consequences from overtopping caused by large floods would be catastrophic."

4.1.4 Eligibility

Under Section 202 of the 1982 Water and Energy Development Appropriations Act, the Secretary of the Army directs provision of flood damage reduction “to a level of protection against flooding at least sufficient to prevent any future losses from the likelihood of flooding as occurred in April 1977." Structures eligible to participate in the Section 202 program are:

- Those that incurred damages from the 1977 flood event, or
- Those that would be damaged by a future flood equal in magnitude to the 1977 event.

Initial estimates of eligible structures for the Floyd County Project using the criteria listed above are presented in Table 4-1.

Table 4-1. Estimated Number of Structures Eligible for Flood Protection

Area	Residential	Nonresidential	Total
Floyd County*	2,691	939	3,630
DPR-1	441	189	630
DPR-2	1500	500	2000
DPR-3	750	250	1000
* excluding the City of Martin			

4.1.5 Participation Rates

Nonstructural measures offered through the Section 202 program are voluntary. Historic participation rates for the Section 202 program range between 5 and 80 percent for residential structures and less than 5 percent for nonresidential structures. A 20 percent sample poll of Levisa Fork residents indicates a potential participation rate of approximately 40 percent for floodproofing and 70 percent for floodplain evacuation (Parsons Brinkerhoff, 2004).

4.2 Potential Flood Damage Reduction Techniques

A management measure is a feature or activity at a site which addresses one or more of the planning objectives. A wide variety of management measures were considered, some of which were found to be infeasible due to technical, economic, or environmental constraints. Each measure was assessed and a determination made regarding whether it should be retained in the formulation of alternative plans. The descriptions and results of the evaluations of the measures considered in this study are presented below.

4.2.1 Nonstructural Measures

Areas not protected by a structural component, such as a levee or floodwall, would be eligible for a voluntary nonstructural program. The scattered, low-density flood-prone development that prevails throughout the floodplain in the project area requires unique solutions. Nonstructural techniques have proven to be very cost-effective in reducing flood damages in such areas.

The nonstructural techniques evaluated for the project area include floodproofing, permanent floodplain evacuation, flood warning system and emergency evacuation plan and flood insurance/floodplain zoning. These measures have been effectively implemented in the Tug Fork and Levisa Fork areas listed in **Table 4-2**.

Table 4-2. Location of Previous Nonstructural Projects in Tug Fork and Levisa Fork Basins

Project	State
Martin County Nonstructural	KY
Pike County, Levisa Fork, Nonstructural	KY
Pike County, Tug Fork, Nonstructural	KY
Pike County, Tug Fork Tributaries, Nonstructural	KY
South Williamson Nonstructural	KY
“Town of Martin” Nonstructural	KY
Buchannan County Nonstructural	VA
Dickenson County Nonstructural	VA
Grundy	VA
Hatfield Bottom Nonstructural	WV
Lower Mingo County Nonstructural	WV
Matewan Nonstructural	WV
McDowell County Nonstructural	WV
Upper Mingo Nonstructural	WV
Wayne County Nonstructural	WV
Williamson Nonstructural	WV

4.2.1.1 Voluntary Floodproofing

4.2.1.1.1 Floodproofing Techniques

Floodproofing consists of altering individual structures or their sites so that flood waters either do not enter a structure (dry floodproofing) or are allowed to enter and exit the structure (wet floodproofing) without producing significant damages. Techniques evaluated include raising-in-place, sealing exterior surfaces, and installing bulkheads in doorways or gate valves in drains. Single-facility ringwalls are also considered a nonstructural flood proofing measure.

***Dry Floodproofing by Raising-In-Place*:** The primary means of floodproofing eligible residential structures is by raising the structure in-place. Determination of the means of floodproofing a specific nonresidential structure is highly dependent upon the construction of the structure, its size and functional use. Access for the physically challenged (e.g., ramps), if required, would be provided for any nonresidential structure found to be eligible to be raised-in-place. The floodproofing of commercial structures is primarily applicable in those instances where residential type structures are used for commercial purposes or sufficient ceiling clearance exists in the structure to construct a raised floor which would not restrict business activities.

***Dry Floodproofing by Veneer Wall or Ringwall*:** These methods are typically costly and only prove cost effective for very high value structures. Evaluating the feasibility of using a veneer wall or a ringwall for an individual structure requires extensive engineering analysis. For this reason, the USACE evaluates individual structure feasibility during project implementation when owners elect to participate in the voluntary program. Where a veneer wall or a ringwall is not cost-effective, voluntary acquisition is offered.

4.2.1.1.2 Level of Protection

Eligible structures within the City of Prestonsburg would be protected to the one percent chance profile plus one foot. Outside the City of Prestonsburg, eligible structures would be floodproofed based on 1977 flood event or the one percent chance, whichever is greater. These structures would be flood proofed to at least the one percent chance level plus one foot of freeboard.

4.2.1.1.3 Floodproofing Eligibility

Floodproofing techniques may not be feasible for some structures due to the structure’s location in the regulatory floodway, the type of construction, or prohibitively high floodwater velocities. Eligibility of a specific structure for floodproofing or floodplain evacuation is based on several factors specific to the individual structure and the flooding experience of the structure. Eligibility factors include:

- location of the structure in the floodplain with respect to the regulatory floodway
- depth of flooding experienced
- floodwater velocities
- a residential structure meeting the DSS threshold
- structural stability
- the functional use of the structure

Eligibility criteria for the various nonstructural measures were developed by the USACE in the 1998 FEIS and are retained in this document. Generally, the least cost alternative, either floodproofing or permanent floodplain evacuation, would be offered to eligible structures within the area affected by a recurrence of the April 1977 flood. However, structures which meet the following criteria are considered ineligible for floodproofing:

- Structures that would require greater than a 12-foot raise (measured from the low ground elevation to the raised 1st floor height) including one foot of freeboard above the target level of protection

- Structures in “dilapidated” condition
- Structures located in the regulatory 100-year floodway
- Tenant-occupied mobile homes if the landowner does not own the mobile home

USACE Great Lakes and Ohio River Division policy requires that all structures eligible for floodproofing must meet certain requirements to be considered DSS. All floodproofed structures must have a potable water system. If an approved potable water source cannot be provided on site, the structure will be considered ineligible for floodproofing and the structure owner will be offered the acquisition option. All floodproofed structures will be connected to a State/County/Public Service Authority (PSA) approved sewage disposal system. If an acceptable system cannot be provided on the lot or an alternative treatment system cannot be provided, the structure owner will be offered the acquisition option.

Flood flow velocities outside the regulatory floodway were not considered to be a significant factor in the project area affecting determination of eligibility for floodproofing. Flood flow velocities in the project area outside the regulatory floodway were estimated to be substantially less than the maximum velocity of 8 feet per second (fps) considered safe for floodproofing.

Structures eligible for floodproofing would be evaluated during implementation to determine their structural integrity. If the structure cannot be raised and remain in a structurally sound condition, or if the cost of eliminating structural deficiencies increases the cost to where it is greater than 110 percent of the total acquisition cost, the structure will be converted to acquisition.

4.2.1.1.4 Conclusion

Voluntary floodproofing is a preferred measure because it generally has minimal impact on the community social and economic structure, provided it is feasible and not more costly than other options. However, floodproofing does not eliminate some residual nuisance damages to property, outbuildings, utilities, and access. It also does not prevent business losses during flooding as the structure would not be accessible during flood events. Floodproofing produces spatially limited, short-duration environmental impacts in the floodplain area, and requires relatively high per-unit investment costs. However, these techniques have been successful in other areas authorized by Section 202 legislation measured in both technical and social acceptability terms.

The acceptability of residential floodproofing is evidenced by the generally high participation rates of eligible property owners volunteering for it in approved Section 202 nonstructural project areas. This technique was retained for further consideration.

4.2.1.5 Permanent Floodplain Evacuation

Permanent evacuation of floodprone areas can be an effective solution for reducing flood damages, especially in situations where protection in place by floodproofing options are not feasible. Permanent evacuation is a voluntary program that would offer eligible residents assistance with relocating to DSS housing out of the floodplain.

Permanent evacuation of structures within the regulatory floodway zone has been shown to reduce the base flood elevation (100-year frequency flood) within a river reach by removing obstructions to the base hydraulic flow. Floodway evacuation therefore generates secondary benefits to surrounding structures and facilities.

4.2.1.5.1 Permanent Floodplain Evacuation Eligibility

Structures eligible for floodplain evacuation would include structures with damages to the lowest habitable floor from the April 1977 flood and located within the regulatory floodway or otherwise declared not eligible for floodproofing (see Section 4.2.1.1.3).

4.2.1.5.2 Permanent Floodplain Evacuation Process

This technique includes purchase of the floodplain structure, payment of relocation assistance funds, relocation of floodplain residents to available flood-safe DSS housing, and, demolition of the existing structure.

Floodplain evacuation may include acquisition or acquisition and relocation to a constructed housing and community development (H&CD) site. In accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (PL 91-646)*, as amended, residential and nonresidential property owners determined to be eligible only for floodplain evacuation would be offered the fair market value for their property (structure and land). In addition to the fair market value of the property, residential owners are offered standard relocation benefits under PL 91-646 to assist in the purchase of a comparable replacement dwelling located out of the April 1977 floodplain area. Displaced persons, including those who rent, would also be compensated for eligible moving expenses. These individuals could relocate to similar housing within Floyd County, if available. If comparable replacement dwellings are not available in the implementation area, the last resort housing provisions of Section 206, PL 91-646 would be implemented on a case-by-case basis, utilizing the most feasible, cost-effective method available. This provision could include making payments in excess of those authorized by Sections 203 and 204 of PL 91-646.

Land acquired through a permanent floodplain evacuation program would subsequently become available for purposes not subject to substantial flood damages, such as preserves, parks, or open land. Property acquired and evacuated by this measure would be acquired in the local sponsor's name, belong to the local sponsor, and if sold by the sponsor, would have appropriate deed restrictions recorded on those lands to ensure appropriate land use and either restrict or prevent development in the floodplain. Acquired and cleared tracts that have areas suitable for home sites located out of the floodway and of suitable ground elevation could be used as recycled lots or resettlement sites on an as-needed basis. The USACE would designate the lots or blocks of lots which could be utilized. The non-Federal sponsor would convey this land for project use as determined necessary by the Government.

4.2.1.5.3 Conclusion

The high residential participation rates (historically greater than 80 percent) of eligible property owners volunteering for evacuation provides evidence of the acceptability of this nonstructural measure. The voluntary evacuation measure was retained for further consideration.

4.2.1.2 Flood Insurance and Floodplain Zoning

The combination of floodplain zoning and flood insurance through the NFIP could help reduce future financial losses due to flooding. Zoning is a legal measure that local jurisdictions could implement to regulate land use. It provides some measure of protection by designating permitted uses of developable land. Federally-subsidized flood insurance coverage for individual properties is available in communities that meet the requirements of the NFIP. Purchase of flood insurance coverage is voluntary and would not protect against flooding, but would reimburse property owners for a portion of losses that might be incurred due to flooding.

Enforcement of floodplain zoning through floodplain management ordinances and the NFIP would gradually contribute to reducing financial losses due to flooding for new construction. However, in the project area, the sole use of floodplain zoning and flood insurance as a solution to flood damages would not be effective. The NFIP allows existing structures to be “grandfathered” in when a community enters the NFIP. The combination of extensive floodplain development and thus frequently recurring losses to the local economy (including business taxes) and financial losses (including lost business) that would not be reimbursed by flood insurance alone. Floodplain zoning and flood insurance would provide a benefit to the project area if used in combination with other flood damage reduction measures.

According to FEMA records for 2003, there were 932 flood insurance policies in the county (308 in Prestonsburg and 624 in the rest of the county, including the Tug Fork basin). This represents approximately 26 percent of the estimated 3,630 total structures within Floyd County eligible for the Section 202 Program.

The use of floodplain zoning and flood insurance would provide a flood damage reduction benefit if used in combination with other flood damage reduction methods and therefore was retained for further consideration.

4.2.1.3 Flood Warning and Emergency Evacuation Plan

A Flood Warning and Emergency Evacuation Plan (FWEEP) was included in the screening analysis. The development, installation and operation of an effective flood warning system and a well coordinated and efficient emergency evacuation program could help reduce flood damages and the likelihood of fatalities during flooding events. Such a system allows residents and businesses the opportunity to evacuate a structure's contents, vehicles and other valued property prior to flooding. However, residual damages to fixed structures and immobile facilities would not reduced by this alternative.

The National Weather Service's IFLOWS has been operational in the Levisa Fork Basin since 1981. Because the system has not achieved full coverage and effectiveness due to a lack of funding, the 1997 General Plan Supplement (GPS) included an IFLOWS upgrade plan. A memorandum of agreement to implement the IFLOWS upgrade is in place with the USACE, other state and Federal agencies, Floyd County, and communities within Floyd County. A Levisa Fork flood warning system and a City of Martin flood warning system have been implemented. Additional gauging stations for the Floyd County system in the tributary areas are planned.

While a FWEEP could only a have limited effect in reducing flood damages, it could be beneficial when used in combination with other flood damage reduction methods. Owners of floodproofed structures are strongly urged to evacuate their structures during a flood event due to a variety of hazards. This measure would best be used in combination with other damage reduction methods and is retained for further consideration.

4.2.1.4 Financial Compensation

This measure would allow eligible property owners to receive financial compensation for future flooding damages. This measure was determined not to be acceptable as a potential nonstructural measure for Floyd County since it does not meet the objectives of Section 202 of PL 96-367 (e.g., it would not improve flood protection or reduce financial losses caused by flooding). Therefore, it was not retained for further consideration.

4.2.1.5 Protection of Government Owned Structures

State, county, or local government and Board of Education owned structures are eligible to be floodproofed or relocated under the relocation provisions of the Engineer Federal Acquisition Regulation Supplement (EFARS) Appendix Q. These structures must meet a "continuing performance of a governmental function" threshold (e.g., police department or fire station may be necessary for emergency response). Final structure eligibility and construction costs are documented during the implementation phase through preparation of a Relocation Design Document Report.

Structure eligibility and baseline cost estimates developed for this report were developed for alternative selection and budgetary projection purposes only. Eligible government owned structures that do not meet the "continuing performance of a government function" criteria may still be eligible for the floodproofing and floodplain evacuation measures. Relocated schools may be used for emergency evacuation shelters if identified in the Emergency Evacuation Plan (EEP) through coordination with the Board of Education and local Emergency Management offices.

Ringwall considerations for the government-owned structures within the DPR-1 area are discussed below. Ringwall construction for municipal buildings was not carried forward for detailed consideration and is discussed below.

- *Prestonsburg High School*: The gymnasium in the back of the school is currently protected by a veneer wall. The current veneer wall is 0.74 foot to 1.70 feet below the new one percent chance event elevation. Modifying the existing veneer wall would bring the wall above the 3-foot maximum veneer height and would require a designed structural wall. Alternatively, a ringwall around the high school would encroach on the floodway and require mandatory acquisitions of adjacent homes. Therefore, neither floodproofing nor a ringwall was considered feasible.

- *Municipal Building*: The considered municipal property does not have enough space to construct the ringwall
- *Prestonsburg Elementary School*: One of the Prestonsburg Elementary School Buildings was considered for ringwall construction. The property does not have enough space to construct the ringwall.
- *Big Sandy Community and Technical College (BSCTC)*: Only one of the buildings is eligible based on its first floor elevation. Construction of a ringwall to provide flood proofing would be feasible for this structure but was not of interest to the BSCTC.

4.2.2 Structural Techniques

Structural measures evaluated for the project area include stream channel modification, reservoirs, stream cleanout, floodwalls and levees. The project area is typical of other areas located in the Big Sandy River Basin, characterized by rugged topography, narrow floodplains, low-density development scattered throughout the floodplain with commercial/residential centers located along the US 23 corridor. This development pattern limits the number of cost effective structural measures that can be formulated to provide flood protection for the entire project area.

4.2.2.1 Channel Modification

Channel modification involves widening, deepening and/or straightening a stream to improve its hydraulic carrying capacity. Widening, deepening, and other channel modifications are generally most effective on small to medium sized streams and where adjacent developments are located an adequate distance from the banks to avoid relocations due to construction. Straightening occasional meanders to increase channel hydraulic capacities and velocities can sometimes provide significant reductions in flood heights in areas subject to headwater flooding.

Preliminary Levisa Fork channel modifications within Prestonsburg city limits were developed to evaluate the ability of channel modification to reduce the one percent chance event floodwater surface elevation. Various channel widths and depths were analyzed and results are listed in **Table 4-3** below. **Chart 4-1** below shows a typical cross section for the 800-foot wide channel. These analyses were performed as qualitative analyses for the screening level purposes. All dimensions are approximate.

Table 4-3. Channel Modification Evaluation at River Station 54.37773 During a One Percent Chance Event

Analysis	Channel Width (ft)		Streambed Elevation (ft)		Water Surface Elevation (ft)	
	Result	Change from Existing	Result	Change from Existing	Result	Change from Existing
Existing	400	0	586.24	0	636.93	0
A	1,200	+800	586.24	0	635.94	-0.99
B	450	+50	580.63	-5.71	634.99	-1.94
C	500	+100	540.53	-45.71	632.44	-4.49
D	700	+300	552.64	-33.6	632.22	-4.71

Note: A 1% Chance Event at River Station 54.37 represents 72,300 ft^3 per second in Levisa Fork flow volume

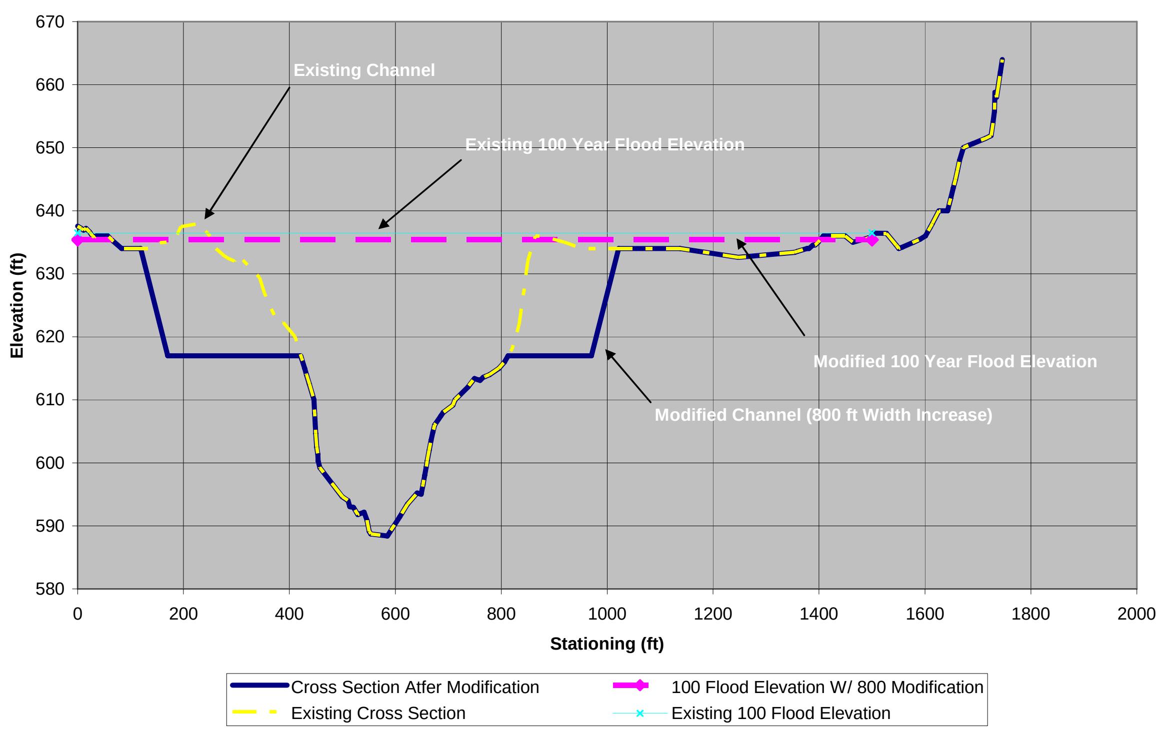


Chart 4-1. Example Levisa Fork Channel Modification

None of the alternatives produced an effective reduction in the floodwater surface elevation for a one percent chance event. Widening the channel to 800 feet with no change in depth would only reduce the 100-year profile by just less than one foot. The largest reduction of 4.71 feet is associated with widening the channel to 300 feet and deepening the channel bottom by 33.6 feet.

In the study area, most available level land is found along the river and is currently occupied by rail, highway, residential and community facilities. Therefore, nearly all of the existing development targeted for protection would need to be removed in order to accommodate an adequately-sized channel. Issues associated with this measure would include acquisition of land and structures along the riverbank, relocation of infrastructure, disposal of dredge material, high maintenance cost, and significant impacts to the aquatic ecosystem.

Because of the insignificant reduction in the one percent chance event floodwater surface profile and associated issues, this measure was not pursued. In addition, the environmental impacts associated with channel modification are not acceptable to the USACE nor are they within current USACE policy.

4.2.2.2 Reservoirs

Reservoirs reduce flood levels by retaining peak runoff until downstream channels can handle the increased flows without flooding. Existing reservoirs operating in the Levisa Fork basin control approximately 42.5 percent of the basin's drainage. In the 1991 and 1997 GPS documents, a dam at Haysi, VA was formulated as an alternative. However, the Haysi Dam watershed-based alternative is not in consideration at this time because required project sponsorship was withdrawn by the Commonwealth of Virginia and Congressional guidance provided in recent appropriation language.

4.2.2.3 Stream Cleanout and Rehabilitation

As part of the recovery from the 1977 flood, the USACE removed obstructions, trash, and major sediment deposits along the Levisa Fork in 1979-80 on behalf of the Appalachian Regional Commission. While overall appearance and conveyance of flows improved to a minor degree, the effect was temporary. Debris and sediments returned during subsequent flood events. In addition, these cleanout operations disturb the stream bed and can have short-term adverse environmental impacts on aquatic life. No further consideration was given to this measure because of its limited effectiveness and potential environmental impacts.

Removing the historic West Prestonsburg Bridge in downtown Prestonsburg was evaluated for its potential to reduce flood profiles. The evaluation showed that the reduction in flood profile for a two percent chance event was six inches, and for a one percent chance event it was less than one inch. The reduction in flood profile was insignificant and did not justify further consideration. This component was not carried forward.

4.2.2.4 Floodwalls and Levees

Given the density of damageable structures within the City of Prestonsburg, floodwalls and levees provide a cost-effective solution to flood damages. Floodwalls and levees provide structural protection to a group of homes and businesses. They can be effective in preventing floodwaters from entering floodplain areas susceptible to flood damages. Because they require relatively narrow right-of-ways for construction, they can be used where channel modification is not practical and can be significantly more effective. Floodwalls and levees are particularly effective in reducing flood damages to major community centers where maintaining the social and economic function of the community is vital to the study area. However, floodwalls and levees can cause significant environmental impacts to land and water resources depending on their design and alignment. They can also be expensive to operate and maintain.

Floodwalls at several Tug Fork basin locations were constructed pursuant to Plan F-1 of the General Plan and approval by the ASA(CW). **Table 4-4** lists the projects which provide SPF level of protection to the more densely developed communities.

Table 4-4. Tug Fork Structural Projects

Location	Floodwall Length	Floodwall Cost	Completed	Population*
Williamson, WV	3500’	$62,700,000	1982-91	3414
West Williamson, WV	6000’	$42,100,000	1982-89	
South Williamson, KY	2750’	$25,900,000	1986-96	732
Matewan, WV	2200’	$57,500,000	1989-97	498

* U.S. Dept of Commerce, Bureau of the U.S. Census.

Levees require a larger construction footprint and have greater impacts on property than floodwalls. Within the City of Prestonsburg, it is not feasible to construct a levee without substantially greater property impacts than a floodwall or construction within the floodway of the Levisa Fork. Therefore, levees were not retained for further consideration. Floodwalls were retained for further consideration due to their potential effectiveness and smaller impact footprint.

4.2.3 Conclusions

4.2.3.1 Nonstructural Techniques

Table 4-5 presents the results of the preliminary screening of nonstructural techniques.

Table 4-5. Results of Nonstructural Technique Evaluation

No.	Measure	Conclusions	Screening Decision
1	Floodproofing	Floodproofing is a preferred measure due to its minimal impact on the community, provided it is feasible and not more costly than other options. Floodproofing has been historically acceptable to residents.	Retained for further consideration.
2	Permanent Floodplain Evacuation	Floodplain evacuation has also been historically acceptable to residents. It is a feasible and beneficial method of reducing flood damages.	Retained for further consideration.
3	Floodplain Zoning and Flood Insurance	These measures are best used in combination with other flood damage reduction methods.	Retained for further consideration.
4	FWEEP	A FWEEP would have only a limited effect in reducing flood damages but could be beneficial in combination with other techniques.	Retained for further consideration.
5	Financial Compensation	Does not reduce flood damage so does not meet the objectives of Section 202 of PL 96-367.	Eliminated from further consideration.
6	Protection of Government Owned Structures	Floodproofing not feasible for structures in downtown Prestonsburg or for Prestonsburg High School. Only one BSCTC structure is eligible and floodproofing feasibility not determined.	Relocation option only is retained for further consideration.

4.2.3.2 Structural Techniques

Table 4-6 presents the results of the preliminary screening of structural techniques.

Table 4-6. Results of Structural Technique Evaluation

No.	Measure	Conclusions	Screening Decision
1	Channel Modification	Most existing development targeted for protection would need to be removed to accommodate adequately-sized channel. Limited effectiveness within the City of Prestonsburg. Unacceptable environmental impacts and cost.	Eliminated from further consideration.
2	Reservoirs	Sponsorship for watershed-based alternative withdrawn by the Commonwealth of Virginia.	Not in consideration at this time.
3	Stream Cleanout and Rehabilitation	Limited and temporary effectiveness, with short-term disturbance to river ecosystems.	Eliminated from further consideration.
4	Floodwalls and Levees	Most cost-effective option given density of structures within the City of Prestonsburg. Levee not feasible within the City of Prestonsburg without substantial property impacts or construction within the Levisa Fork floodway.	Levee option eliminated, but floodwall option retained for further consideration.

4.3 Development and Evaluation of Preliminary Floodwall Alternatives

The potential for increased structure values and additional development within the City of Prestonsburg indicates that a floodwall structure may be more cost-effective in reducing flood damages than nonstructural measures. A variety of floodwall alignments and levels of protection were developed for evaluation. Each is described in this section, along with the screening evaluation results.

Structural alignments, along with preliminary contractor work limits are initially laid out on the project mapping to minimize adverse effects to adjacent structures while protecting as many structures as possible. Construction operations, real estate requirements, topography, flood elevations, floodways, economics and environmental effects are then evaluated by the team to develop the optimum final alignments for each structural alternative. The USACE design team followed the guidance provided in “Guidance Letter 16, Clarification of Policy on Relocations at Flood Control Projects, Paragraph 6.b, Intercepted Interior Drainage” to determine that collection of interior drainage was a “project cost” and therefore included in the project design as appropriate.

4.3.1 Protection from 1977-level Event

A floodwall within the City of Prestonsburg would provide protection to eligible structures from an event similar in magnitude to the April 1977 flood. The floodwall length could be between 12,500 and 17,000 feet, depending on the areas to be protected. Wall heights could range from less than one foot to more than 26 feet tall along this length.

The April 1977 flood was an approximate two percent chance[7] event within the City of Prestonsburg. Therefore, a floodwall would not provide protection for a larger event and would not be certified by FEMA in association with the NFIP. All new construction behind this wall would have to be elevated to the one percent chance event protection level.

Discussion with Floyd County officials indicates that this level of protection would not be useful to the community. In addition, this floodwall could give residents a false sense of protection from a larger flood event.

Screening Decision: Floodwalls with 1977-level protection were not carried forward for further evaluation.

4.3.2 Protection from Standard Project Flood

As previously discussed, the Fiscal Year 1982 Supplemental Appropriations Act (PL 97-257) of September 10, 1982 directed that "high levees and floodwalls" in urban areas provide for SPF level of protection where the consequences from overtopping would be catastrophic. Therefore, a floodwall with SPF-level protection was included in the screening evaluation.

A floodwall within the City of Prestonsburg would provide protection to eligible structures from the SPF. The floodwall length would be approximately 17,000 feet, with wall heights ranging from 4.5 feet to nearly 30 feet tall along this length. A 2.5-foot superiority is included in the wall height.

An overtopping analysis was performed for a floodwall alignment ending at the BSCTC. Two bridges leading in and out of the City of Prestonsburg, located downtown and just before the college, are constructed up to the 500-year flood level. Results of this analysis showed that there was adequate response time to evacuate. Therefore, this alternative is not eligible for further consideration because the consequences of overtopping would not be catastrophic.

Screening Decision: Floodwalls with SPF-level protection were not pursued because analysis showed they were not necessary.

4.3.3 Long Floodwall Alignment Protecting Downtown Prestonsburg and Extending to Wastewater Treatment Plant

This alignment extends around the downtown area and extends beyond the wastewater treatment plant (WTP) and protects to the one percent chance event (see **Figure 4-1**). The floodwall length would be approximately 17,000 feet, with wall heights ranging from less than one foot to 25 feet tall along this length. A 2.5-foot superiority is included in the wall height. This structure would protect a total of 310 eligible structures, including

[7] Commonly referred to as a "50-year frequency" flood event.

175 residential and 135 nonresidential structures. Construction of a floodwall would require 14 mandatory relocations.

At the WTP, all components except for the drying beds are constructed above the 100 year flood level. The drying beds are not eligible for protection. Protection of the WTP by a floodwall would facilitate expansion of existing facilities. With the wall in place, the WTP would be able to build facilities below the 100-year flood elevation. Portions of the floodwall around the WTP would be up to 25 feet tall because of steep topography. Construction of this portion would also require substantial amounts of fill, which could require relocation of the drying beds. Floyd County could consider "buying up" to this alternative, however, because of the height, this section of wall would be very costly. Discussion with the local project sponsor indicates that this floodwall would be of limited additional benefit.

Three alignment variations in the North Arnold Avenue area were considered to address community concerns. Residents along the Levisa Fork side of North Arnold Avenue were concerned that a floodwall behind their homes would obstruct their view of the river and lower property values. The three variations are described below.

- Raising North Arnold Avenue between the bridge and Prestonsburg High School: This variation would require raising the roadway or constructing a short wall down the centerline of the road. Either of these options would create traffic safety issues. The numerous gate closures would impede access to individual homes. This variation is not considered to be feasible.
- Shifting the floodwall alignment to run down the alley behind North Arnold Avenue: This alleyway is ten feet wide and has garages opening onto it along its entire length. This alignment would require six gate closures, acquisition of several structures, and relocation of utilities. This variation is not considered to be feasible.
- Shifting the floodwall alignment riverward to reduce the number of mandatory acquisitions along North Arnold Avenue and reduce impacts to residents' backyards. This variation is not considered to be feasible because it would place fill in the floodway and increase the height and cost of the floodwall in this area.

Screening Decision: This measure was not carried forward for further evaluation. Portions of the alignment around WTP would be up to 25 feet tall because of the steep topography. The county would not be able to provide the additional costs of the wall.

4.3.4 Long Floodwall Alignment Protecting Downtown Prestonsburg and Extending to the Big Sandy Community and Technical College

The alignment begins at the intersection of South Lake Drive and Hughes Street, and follows Riverside Drive, Central Avenue, and South Front Street consisting of 1,662 feet of gravity wall, eight stoplog closures at driveways with two stoplog storage buildings, and raised roadway pavement.

The floodwall length would be approximately 14,600 feet, with wall heights ranging from less than one foot to 11 feet tall along this length (see **Figure 4-2**). A one-foot superiority is included in the wall height.

This structure would protect a total of 311 eligible structures in Prestonsburg, including 175 residential and 136 nonresidential structures. An additional 238 residential and 93 nonresidential structures that are not considered eligible for the Section 202 program would be protected behind the floodwall. [8] Construction of this floodwall would require mandatory relocation of nine residences.

This alignment extends around the downtown area and ties into high ground before reaching the wastewater treatment plant and protects to the one percent chance event. The upstream section of the Long Wall alignment achieves this level of protection by raising roadways and construction of a gravity wall up to 2.5 feet in height.

An I-wall floodwall begins near Goble Street and follows the top of riverbank for 900 feet transitioning into an existing levee, which will be raised, near the existing downtown pump station. This section of I-wall averages five feet in height and has two pedestrian gate closures and one 24-foot wide by 5.2-foot tall gate closure at the access road to the lower bank parking area.

The existing downtown pump station would be upgraded with a 400 kilowatts (KW) generator to provide backup power. A new 5 foot by 5 foot box culvert 1,705 foot long would be constructed to collect interior drainage in the downtown area and transport it to the existing pump station.

The I-wall begins again on the downstream side of KY 114, the main access into downtown Prestonsburg, and continues for 8,272 feet along the top of the riverbank ending in the KY 321 embankment, just upstream of the WTP. This section of I-wall averages eight foot in height and would have eight pedestrian openings and two 24 foot wide by 9.2 foot tall gate closures for access to the Prestonsburg High School lower parking area.

A new 108,000 gallon per minute (gpm) pump station would be located just downstream of the high school to pump the interior drainage over the floodwall during flood events. Additionally a gate well and ponding area would be required at the downstream end of the project between the college and waste water treatment plant.

Three borrow areas have been identified to provide random fill for the I-wall construction and are referred to as Prestonsburg (PB)-2 at 15.8 acres, Spurlock Creek at 17.2 acres, and Granny Fitz Branch at 15 acres. The Dewey Dam spoil area is currently being evaluated as a possible rock borrow and spoil disposal area for approximately 20,000 cubic yards of material.

[8] Ineligible structures protected by the floodwall include structures partially protected by the one-foot "freeboard" and structures not meeting the "habitability" standard.

This alignment also provides protection for an electrical substation adjacent to Prestonsburg High School. This substation would provide power to a proposed pump station in this section of the floodwall alignment. Construction in the area still remains a concern because of low-hanging power lines. Special precautions would be needed to protect workers, equipment and power lines.

This long wall alignment provides protection to the BSCTC. Only one BSCTC structure is eligible based on its first floor elevation.

Three alignment variations in the North Arnold Avenue area were considered to address community concerns. Residents along the Levisa Fork side of North Arnold Avenue were concerned that a floodwall behind their homes would obstruct their view of the river and lower property values. The three variations are described below.

- Raising North Arnold Avenue between the bridge and Prestonsburg High School: This alternative alignment is the same until crossing KY 114. Instead of paralleling the top of bank, the floodwall would run down the center of a widened Arnold Avenue until reaching Prestonsburg High School. The alignment would then turn back to the river and follow the remainder of the Long Wall alignment. The wall down Arnold Avenue would eliminate bank protection for approximately 2,000 linear feet of the alignment. However it would require at least two additional gate closures at 40 foot wide by 6 foot tall and 40 foot wide by 7.5 foot tall. Nonstructural measures would be used to provide protection for the structures outside the floodwall, including those along the riverbank along Arnold Avenue. This variation would create traffic safety issues. Also, the numerous gate closures would impede access to individual homes. This variation is not considered to be feasible.

- Shifting the floodwall alignment to run down the alley behind North Arnold Avenue: This alleyway is ten feet wide and has garages opening onto it along its entire length. This alignment would require acquisition of several structures, relocation of utilities, and six gate closures. This variation is not considered to be feasible.

- Shifting the floodwall alignment riverward to reduce the number of mandatory acquisitions along North Arnold Avenue and reduce impacts to residents' backyards. This variation is not considered to be feasible because it would place fill in the floodway and increase the height and cost of the floodwall in this area.

Screening Decision: This alignment was carried forward to feasibility level review without the three alignment variations near North Arnold Avenue.

4.3.5 Long Floodwall Alignment Protecting Downtown Prestonsburg and Extending to the Blackbottom Area

This alignment extends around the downtown area, past the Blackbottom area and then turns away from the Levisa Fork to tie into high ground before reaching the BSCTC (see

Figure 4-3). The Blackbottom area is lower than the downtown area and is where the Levisa Fork overtops its banks during heavy rainfall events and begins to flood the central part of downtown Prestonsburg. This alignment would protect to the one percent chance event. This alignment would also provide protection to the substation and includes raised roadways, curbs and small wall sections in the downtown area. Nonstructural measures would be used to provide protection for structures outside the floodwall including a ringwall around the science building at the BSCTC.

The floodwall length would be approximately 13,000 feet, with wall heights ranging from less than one foot to approximately ten feet tall along this length. A one-foot superiority is included in the wall height.

This structure would protect a total of 308 eligible structures in Prestonsburg, including 175 residential and 133 nonresidential structures. An additional 217 residential and 77 nonresidential structures that are not considered eligible for the Section 202 program would be protected behind the floodwall. [9] Construction of a floodwall would require mandatory relocation of nine residences.

Three alignment variations in the North Arnold Avenue area were considered to address community concerns, and are the same ones described in Section 4.3.4. The variations were not found to be feasible.

Screening Decision: This alignment was carried forward to feasibility level review without the three alignment variations near North Arnold Avenue.

4.3.6 Short Floodwall Alignment Protecting Downtown Prestonsburg

This alignment extends around Prestonsburg's central business district (see **Figure 4-4**). Because most of the structures in the business district are large and older, the only realistic alternative for this area is a structural measure. The structures individually can not be floodproofed because of their size and proximity to each other. This alignment would protect to the one percent chance event by a combination of a gravity wall, raised roadways, a floodwall and an I-wall as described for the upstream section of the Long Wall in Section 4.3.4. This structure would protect a total of 170 eligible structures, including 70 residential and 100 nonresidential structures. Construction of this floodwall would require two mandatory relocations.

The floodwall length would be approximately 7,000 feet, with wall heights ranging from less than one foot to approximately seven feet tall along this length. A one-foot superiority is included in the wall height.

The alignment follows the alignment described for the Long Wall to the existing pump station. The I-wall would then parallel Dingus Street and terminate at high ground above

[9] Ineligible structures protected by the floodwall include structures partially protected by the one-foot "freeboard" and structures not meeting the "habitability" standard.

Central Avenue. Average wall height would be six feet with two pedestrian gate closures, and three roadway closures. The access to the lower parking lot for the Commonwealth Bank would be approximately 24 feet wide by 5.1 feet tall. Across Lake Drive, the access would be approximately 70 feet wide by 6.3 feet tall, and across Central Avenue the access would be approximately 32 feet wide by 7.4 feet tall.

Interior drainage would require a new five foot by five foot concrete box culvert 1,705 feet in length and upgrading the existing pump station by providing a 400KW natural gas –fired generator for backup power.

An "invisible wall"[10] was briefly considered for the portion of wall along East Dingus Street. An evaluation showed that closure time for this wall could be up to 12 hours, which is not adequate for the observed rate of rise of the Levisa Fork, allowing the river to overtop before the wall was closed. This variation was not considered feasible.

Nonstructural measures would be utilized to provide protection for the remaining structures outside the floodwall. The unprotected Blackbottom low area would still flood under this alignment. An evaluation of the flooding patterns showed potential egress problems for downtown Prestonsburg for events larger than the one percent chance.

Screening Decision: This measure was not carried forward for further evaluation. Alignment protects downtown Prestonsburg only. The unprotected Blackbottom low area would still flood, resulting in egress problems for protected areas for events larger than the one percent chance event.

4.3.7 Short Floodwall Protecting Blackbottom Area

The Blackbottom floodwall would circle Prestonsburg High School and the Blackbottom neighborhood only (see **Figure 4-5**). This alignment protects to the one percent chance event in the Blackbottom area, and because the Blackbottom area is lower than downtown Prestonsburg, it would also provide 1977-level flood protection to the central business district. This structure would protect a total of 63 eligible structures, including 50 residential and 13 nonresidential structures. Construction of this floodwall would require seven mandatory relocations.

An I-wall would begin on the east side of KY 321, cross the road with a 72-foot wide by 9.2-foot tall gate closure, parallel the high school to reach the top of bank, follow the top of bank and then turn back toward KY 321 and terminate at high ground near the college. The entire length of 4,756 feet would be I-wall with an average height of nine feet. A one-foot superiority is included in the wall height.

[10] An "invisible wall" is a removable floodwall that is erected only when flood waters threaten. Once the flood recedes, the wall is disassembled and stored.

In addition to the gate closure at KY 321, a 40-feet wide by 7.2-feet tall closure would be required at North Arnold, two 20-feet wide by 9.2-feet tall closures at the access road to the school parking lot, and a 30-feet wide by 8-feet tall closure across KY 1428 as well as three pedestrian gate closures. A new 108,000 gpm pump station would be located just downstream of the high school to pump the interior drainage over the floodwall during flood events. Nonstructural measures would be needed to provide protection for the remaining structures outside the floodwall. However, the central business district would still flood from backup of storm sewers.

Screening Decision: This measure was not carried forward for further evaluation. Downtown could still get flooded from backup of storm sewers.

4.3.8 West Prestonsburg Floodwall

This alignment extends around the West Prestonsburg community on the opposite side of the Levisa Fork from Prestonsburg (see **Figure 4-6**). This alignment protects to the one percent chance event in the West Prestonsburg area.

The floodwall length would be approximately 3,200 feet, with wall heights between approximately five and nine feet along this length. A one-foot superiority is included in the wall height. This structure would protect a total of 31 eligible structures, including 28 residential and 3 nonresidential structures.

Screening Decision: The West Prestonsburg area does not contain enough structures to justify a floodwall, and this alignment was not carried forward for further evaluation. Therefore, West Prestonsburg would be included in the nonstructural program.

4.3.9 Lancer Area Floodwall

A floodwall was considered for the community of Lancer, KY, approximately two miles upstream of the City of Prestonsburg. Upon investigation, project engineers noted that the area’s topography would require a floodwall to be constructed at the top of bank and result in fill placed in the regulatory floodway. In addition, most of structures in this area are located on top of the bank and would thus need to be acquired to construct the wall. A structural measure was thus determined to be infeasible, and no further investigation was performed.

Screening Decision: No structural measure would be feasible in this area. Therefore, the Lancer Area would be included in the nonstructural program.

4.3.10 Conclusions

Table 4-7 presents the results of the preliminary screening of structural measures.

Table 4-7. Screening Results of Structural Measures within the City of Prestonsburg

No.	Measure	Conclusions	Screening Decision
1	1977 Flood Wall	This component would only provide 50-year event level of protection and therefore would not be certified by FEMA to eliminate the flood insurance requirement. All new construction behind this wall would have to be elevated to the 100-year event level.	Not carried forward.
2	Standard Project Flood Wall	An overtopping analysis was performed for the long alignment extending to BSCTC. Results of this analysis showed that there was adequate response time to evacuate. This alternative is not required for further consideration because the consequences of overtopping would not be catastrophic.	Not carried forward.
3	Long Floodwall with WTP	Alignment extends around downtown area and around WTP. Portions of the alignment around WTP up to 25 feet tall because of steep topography. The county would not be able to provide the additional costs of the wall.	Not carried forward.
4	Long Floodwall ending at the BSCTC	Alignment protects downtown Prestonsburg, Blackbottom Area and BSCTC. Variations with North Arnold Avenue were not feasible.	Carried forward to feasibility level review without variations near North Arnold Avenue.
5	Long Floodwall ending at Blackbottom	Alignment protects downtown Prestonsburg and Blackbottom area. Variations with North Arnold Avenue were not feasible.	Carried forward to feasibility level review without variations near North Arnold Avenue.
6	Downtown Prestonsburg Short Floodwall	Alignment protects downtown Prestonsburg only. The unprotected Blackbottom low area would still flood, resulting in egress problems for protected areas for events larger than the one percent chance.	Not carried forward.
7	Blackbottom Floodwall	Alignment protects Blackbottom area. Downtown would still get flooded from backup of storm sewers.	Not carried forward.
8	West Prestonsburg Floodwall	Not enough structures to justify a floodwall.	Not carried forward.
9	Lancer Area	Most of the structures in this area would have to be acquired to construct the wall. No structural measure would be feasible in this area.	Not carried forward.

4.4 Final Array of Alternative Plans

4.4.1 Basis for Alternative Plans

Based on the screening level review of nonstructural and structural measures, two alternative plans were developed that incorporate the feasible components described in the previous sections. A third plan would consist of applying nonstructural measures throughout the Floyd County project area. The fourth plan is the No Federal Action or the "Without Project' Alternative. The selection of the final array of the alternatives was based on the planning objectives as described in Section 3.3. The alternative plans are presented in **Table 4-8** below.

Table 4-8. Alternative Plans

Alternative Plan No.	Name	Description
1	No Federal Action	No action by the Federal government to implement flood damage reduction program
2 (Preferred)	Long Wall Ending at BSCTC plus Nonstructural Program	Includes Structural Measure 4 plus voluntary nonstructural program.
3	Long Wall Ending at Blackbottom plus Nonstructural Program	Includes Structural Measure 5 plus voluntary nonstructural program.
4	Total Nonstructural Program	Includes voluntary nonstructural program only.

The structural components of Alternative Plans 2 and 3 were reviewed to see if they could be optimized with respect to cost and community disruption. Minor adjustments were made in each alignment to minimize the number of mandatory acquisitions and structures removed.

The extent of slope protection needed was evaluated for the two feasible structural measures. Stone slope protection would be needed to protect the flood protection system from failure due to erosion of the riverbank. The right descending bank of Levisa Fork through the project generally has a steepened lower slope that ranges from 20 feet in height in the upstream portion of the project to about ten feet near the downstream limits. Slopes of this lower slope vary from 1:1.6 to 1:1.9. These slopes appear only marginally stable and have a limited amount of vegetation. A natural bench or terrace that is between 20 and 60 feet wide is found at approximate elevation 610 feet AMSL throughout most of the project. This feature enhances the overall stability of the riverbank slopes and provides a limited buffer against global instability of the riverbank if erosion of the lower slope were to occur. An upper slope then extends from this lower terrace to the top of the riverbank. This slope is generally 20 to 25 feet high and has a slope of about 1:2.

Isolated reaches of lower riverbank slope within the project limits exhibit flow geometries that are generally more conducive to erosion, such as short reaches at outside bends in the channel. In other areas, in situ soil shear strength properties are marginal, and erosion of the riverbank would be a concern because of the potential for slope instability concerns. The lower riverbank slopes in both areas would need to be protected using an armored toe consisting of a wedge of 12-inch diameter stone. Applicable locations identified by the design team include the reach between floodwall Stations 57+00 and 62+00 (between the Commonwealth bank and the SR 114 bridge in downtown Prestonsburg) and between floodwall Stations 105+00 and 124+00 (between Dickerson Street and Porter Lane). Vegetation would be removed from the lower slope, and slopes would be graded prior to stone placement. A geotextile fabric should be selected and placed on the slope to provide separation between slope soils and strength to the stone armoring. The armored toe will be approximately ten feet wide and five feet high and will be founded about two feet below the normal river level. Vegetation will be allowed to naturally establish over this armored toe.

More numerous reaches of the upper slope would be protected from erosion by using stone. These areas have been identified as having higher potential for localized erosion of the upper slope due to high river velocities. Such erosion can lead to sliding or overturning failures of concrete structures, or slope failures through earthen flood control structures. Upper slopes in all identified reaches would be regraded to a stable geometry before placing a 3-foot thickness of 24-inch stone over a geotextile filter in these areas. This erosion protection system is mostly conventional and more proven than other configurations. The stone on the upper slopes must be kept clear of vegetation to ensure its functionality throughout the project's design life (maintenance is responsibility of the project sponsor).

4.4.2 Plan 1: No Federal Action

Consideration of the "No Federal Action" option is required as one of the alternatives in order to comply with NEPA requirements. The No Federal Action Plan forms the basis against which all other alternative plans are measured. This plan is required by NEPA to be included among the candidate plans in the final array of alternatives.

The No Federal Action Plan assumes the Federal Government would not implement any type of comprehensive flood damage reduction program in the project area. It reflects continuation of existing economic, social, and environmental conditions and trends in the project area as described in Chapter 5. The project area would continue to endure frequent floods, economic loss, and potential loss of life. Inherent with this plan would be the continuation of Federally-subsidized flood insurance coverage for property owners that is currently available through the NFIP and the enforcement of local floodplain zoning ordinances. This plan would result in no expenditure of Federal funds to implement a comprehensive flood damage reduction plan in the project area. However, Federal expenditures to subsidize the flood insurance program and to assist in flood recovery operations are assumed to continue.

4.4.3 Plan 2: Long Floodwall Ending at Big Sandy Community and Technical College plus Nonstructural Program

This plan was developed by combining two management measures, the long floodwall ending at BSCTC (Measure 4) and the voluntary nonstructural program in the remainder of Floyd County. The structural alignment is shown in **Figure 4-2 and Figure 4-7**.

Features:

Venture-Level Cost (Phase I program area only): $140,740,000

Floodwall Portion - $75,497,000

Nonstructural Portion - $65,244,000 (assumes 100 percent participation in nonstructural program component)

Eligible structures protected by wall: 311 (175 residential, 136 nonresidential)

Additional ineligible structures protected by floodwall: 331 (238 residential, 93 nonresidential)

Structures eligible for nonstructural measure in remainder of DPR-1 area: 319 (266 residential, 53 nonresidential)

Structures impacted by floodwall: 7 Garages, 9 Residences, 1 Government structure (former emergency services office)

The proposed structural component would provide flood damage reduction for infrastructure, roadways, homes, and businesses in most of Prestonsburg through a combination of the floodwall, gates, raised roadways, curbs, and small wall sections in the downtown area. The plan's floodwall would prevent Levisa Fork overtopping in the Blackbottom area, which now causes flooding in the central business district as well as in Blackbottom. The floodwall would also extend to protect the BSCTC and its campus. Flood insurance costs would be reduced for those structures protected by the floodwall.

4.4.4 Plan 3: Long Floodwall Ending at Blackbottom plus Nonstructural Program

This plan was developed by combining two management measures, the long floodwall ending at Blackbottom area (Measure 5) and the voluntary nonstructural program in the remainder of Floyd County. The structural alignment is shown in **Figure 4-3 and Figure 4-7**.

Features:

Venture-Level Cost (Phase I program area only): $142,171,000

Floodwall Portion - $65,197,000

Nonstructural Portion - $76,974,000 (assumes 100 percent participation in nonstructural program component)

Eligible structures protected by wall: 308 (175 residential, 133 nonresidential)

Additional ineligible structures protected by floodwall: 294 (217 residential, 77 nonresidential)

Structures eligible for nonstructural measure in remainder of DPR-1 area: 322 (266 residential, 56 nonresidential)

Structures impacted by floodwall: 3 garages, 9 Residences, 1 Government structure (former emergency services office)

The proposed structural component would flood damage reduction for infrastructure, roadways, homes, and businesses in most of Prestonsburg through a combination of the floodwall, gates, raised roadways, curbs, and small wall sections in the downtown area. The plan's floodwall would prevent Levisa Fork overtopping in the Blackbottom area, which now causes flooding in the central business district as well as in Blackbottom. Flood insurance costs would be reduced for those structures protected by the floodwall.

The floodwall would not protect the BSCTC and its campus. BSCTC would be able to participate in the nonstructural program for eligible structures.

4.4.5 Plan 4: Total Nonstructural Program (Measure 12)

This plan includes only nonstructural measures throughout the Floyd County project area. No floodwall would be constructed.

Features:

Venture-Level Cost (Phase I program area only): $221,470,000 (assumes 100 percent participation in nonstructural program)

Eligible structures in nonstructural Phase I program area: 348 residential, 168 nonresidential.

This voluntary nonstructural program would provide flood damage reduction for individual structures by floodproofing or acquiring and removing them. It would include no mandatory acquisitions and no structures taken for construction.

4.5 Comparison of Alternatives

All of the plans in the final array except Plan 1, the No Federal Action Alternative, would entail a cost to meet the planning objectives. The No Federal Action Alternative would not meet planning objectives. The number of eligible structures in Plans 2, 3, and 4 is equal. The number of eligible participants who choose to participate in the nonstructural portion is not known at this time, but for comparison is assumed to be 100 percent. Venture-level costs for Plan 2 are less than either Plan 3 or Plan 4, and therefore Plan 2 is considered the least cost plan.

The NFIP would continue to be implemented within the project area, even under Alternative Plan 1, No Federal Action. The NFIP does reduce some of the financial losses due to flooding, but flood insurance has limited coverage and only approximately 25 percent participation within the county.

Nonstructural measures such as floodproofing, floodplain evacuation, flood warning systems and emergency evacuation programs, and strict enforcement of NFIP ordinances have proven to be cost effective, viable approaches to reducing flood damages in Section 202 project areas. Alternative Plans 2, 3, and 4 incorporate all these measures. Alternative Plans 2 and 3 feature nonstructural measures, but also incorporate a floodwall to protect portions of the City of Prestonsburg.

Table 4-9 presents a comparison of alternative plans.

Table 4-9. Comparison of Alternatives					
		Alternative Plan 1 **No Federal Action**	**Alternative Plan 2** **Nonstructural plus Floodwall to BSCTC (Preferred)**	**Alternative Plan 3** **Nonstructural plus Floodwall to Blackbottom**	**Alternative Plan 4** **Nonstructural Program**
PLANNING OBJECTIVES	Most cost-effective, implementable plan that provides the mandated flood protection.	Does not meet planning objective. Federal expenditures to subsidize the flood insurance program and to assist in flood emergency and recovery operations would continue.	$140,740,000 (Venture Level Costs) Floodwall: $ 75,497,000 Nonstructural: $ 65,214,000	$142,171,000 (Venture Level Costs) Floodwall: $ 65,197,000 Nonstructural: $ 76,974,000	$221,470,000 (Venture Level Costs
	Reduce, to the extent possible, financial and personal losses due to flooding.	Does not meet planning objective. No flood damage reduction would be provided.	Floodwall would protect 311 eligible structures and 331 additional ineligible structures[11]. Nonstructural program offered to estimated remaining 3,319 eligible structures throughout Floyd County.	Floodwall would protect 308 eligible structures and 294 additional ineligible structures. Nonstructural program offered to estimated remaining 3,322 eligible structures throughout Floyd County.	Nonstructural program for estimated 3,630 eligible structure throughout Floyd County,
	Maintain, to the extent possible, the social and cultural resources of the area.	Does not meet planning objective. Indirect and long-term impacts would be negative due to continued flood damage.	*Structural Areas:* Protects downtown Prestonsburg, Blackbottom Area and BSCTC. *Nonstructural Areas:* Affected by participation rate and also by mix of floodproofing and relocation.	*Structural Areas:* Protects downtown Prestonsburg and Blackbottom Area. *Nonstructural Areas:* Affected by participation rate and also by mix of floodproofing and relocation.	Affected by participation rate and also by mix of floodproofing and relocation.
	Minimize, to the extent possible, the social and economic disruptions due to project construction and mandatory relocation.	Meets this planning objective, but does not provide flood damage reduction.	Affected by participation rate and also by mix of floodproofing and relocation. *Structural Areas:* Short-term impacts from floodwall construction. Mandatory acquisition of nine residences and one government structure (former emergency services office) to build floodwall.	Affected by participation rate and also by mix of floodproofing and relocation. *Structural Areas:* Short-term impacts from floodwall construction. Mandatory acquisition of nine residences and one government structure (former emergency services office) to build floodwall.	Affected by participation rate and also by mix of floodproofing and relocation. Long-tem but localized impacts from construction. No mandatory acquisitions. Could have more disruptive effect on City of Prestonsburg than other Plans because nonstructural measures offered in downtown area.
	Develop the most socially acceptable, environmentally sound plan.	Does not meet planning objective. No flood damage reduction would be provided.	Voluntary program in nonstructural areas is socially acceptable. Nine mandatory relocations in floodwall area.	Voluntary program in nonstructural areas is very socially acceptable. Nine mandatory relocations in floodwall area.	Generally acceptable due to program's voluntary nature. Could be larger disruption to City of Prestonsburg because nonstructural measures offered in downtown area.

[11] Ineligible structures protected by the floodwall include structures partially protected by the one-foot "freeboard" and structures not meeting the "habitability" standard.

Table 4-9. Comparison of Alternatives

		Alternative Plan 1 No Federal Action	Alternative Plan 2 Nonstructural plus Floodwall to BSCTC (Preferred)	Alternative Plan 3 Nonstructural plus Floodwall to Blackbottom	Alternative Plan 4 Nonstructural Program
PHYSICAL RESOURCES	Land Use / Land Cover	No direct impact. A minor, indirect adverse effect could occur because periodic flooding may discourage investment, resulting in deterioration of structures and loss of property value for flood-prone areas.	*Nonstructural Areas:* Long term beneficial impacts as future human habitation of the floodway would be prohibited and the land would revert to its natural condition. Some land outside the floodway could be filled and redeveloped in accordance with local land use plans. *Structural Areas:* Floodwall will disturb approximately 63 acres and cause nine residential relocations. Likely that vacant structures and vacant lots will be infilled or redeveloped after the floodwall is in place. Land values could rise as a result of the flood protection.	*Nonstructural Areas:* Long term beneficial impacts as future human habitation of the floodway would be prohibited and the land would revert to its natural condition. Some land outside the floodway could be filled and redeveloped in accordance with local land use plans. *Structural Areas:* Floodwall will disturb approximately 39 acres and cause nine residential relocations. Likely that vacant structures and vacant lots will be infilled or redeveloped after the floodwall is in place. Land values could rise as a result of the flood protection.	Long term beneficial impacts as future human habitation of the floodway would be prohibited and the land would revert to its natural condition. Some land outside the floodway could be filled and redeveloped in accordance with local land use plans. The amount of land use change within the floodplain would depend on the participation rate for this voluntary program.
	Topography and Drainage Geology and Soils	Continued erosion and sedimentation from periodic flooding. Erosion of Levisa Fork banks associated with recurrent flooding would also continue. Existing bank instability of May Branch, Trimble Branch and Campus Branch at their confluence with the Levisa Fork would continue or worsen.	*Nonstructural Areas:* Minimal impact to the geology and soils are anticipated. Direct impacts would be limited to relatively small areas where some of the nonstructural measures (raise-in-place, single-facility ringwalls, etc.) would occur. Minor indirect impacts to geology and soils could result from clearing and grading activities associated with the relocation of residences and businesses to flood safe locations. *Structural Areas:* Minor direct impacts to geology and soils would include localized soil disturbance during the construction of either floodwall. Removal of material from borrow areas could change drainage patterns.		Minimal impact to geology and soils. Direct impacts limited to relatively small areas where nonstructural measures (raise-in-place, single-facility ringwalls, etc.) would occur. Minor indirect impacts to geology and soils could result from clearing and grading activities associated with the relocation of residences and businesses to flood safe locations.
	Air Quality	No direct impacts. Continued localized fugitive dust and vehicle emissions associated with cleanup from recurrent flooding events.	*Nonstructural Areas:* Direct, short-term, localized impacts from construction. *Structural Areas:* Floodwall construction activities have the potential to cause localized temporary, nuisance air quality impacts.		Direct, short-term, localized impacts from construction.
	Noise and Vibration	No direct impacts. Continued periodic noises from equipment and vehicles during post-flood cleanup.	*Nonstructural Areas:* Direct short-term impacts would include increased localized noise from construction and demolition activities, construction equipment, and haul trucks. No long-term impacts are anticipated. *Structural Areas:* Temporary noise during floodwall construction could significantly impact area residents, businesses, and schools during peak construction periods. Long-term occasional direct impacts from low-frequency noise and vibration generated by the proposed pump stations.		*Nonstructural Areas:* Direct short-term impacts would include increased localized noise from construction and demolition activities, construction equipment, and haul trucks. No long-term impacts are anticipated

Table 4-9. Comparison of Alternatives					
		Alternative Plan 1 No Federal Action	**Alternative Plan 2 Nonstructural plus Floodwall to BSCTC (Preferred)**	**Alternative Plan 3 Nonstructural plus Floodwall to Blackbottom**	**Alternative Plan 4 Nonstructural Program**
ECOLOGICAL RESOURCES	Water Quality and Aquatic Resources	No direct impacts to water quality or aquatic resources. Indirect impacts to the Levisa Fork and other area water and aquatic resources would continue due to human encroachment on riparian habitats and buffers, point and non-point source pollutants, and pollution associated with periodic flooding in developed areas within the floodplain. Periodic flooding would continue to flood wastewater treatment beds, sending contaminants into the Levisa Fork.	*Nonstructural Areas:* Minor indirect impacts due to increased sedimentation during construction activities. *Structural Areas:* Armored toe bank stabilization near floodwalls would not significantly affect the stream characteristics during smaller storm events. During large storm events, floodwaters would be more restricted within floodwall limits, increasing water velocity. Trimble, May and Campus Branches would be directly impacted. Direct, short-term adverse effects on Levisa Fork, and Trimble, May and Campus Branches water quality due to increased sedimentation during construction. Direct, long-term beneficial impacts to the Levisa Fork would result from stabilization of the Trimble, May, and Campus Branches because of less erosion and sedimentation.	*Nonstructural Areas:* Minor indirect impacts due to increased sedimentation during construction activities. *Structural Areas:* Armored toe bank stabilization near floodwalls would not significantly affect the stream characteristics during smaller storm events. During large storm events, floodwaters would be more restricted within floodwall limits, increasing water velocity. Trimble and May Branches would be directly impacted. Direct, short-term adverse effects on Levisa Fork, and Trimble and May Branches water quality due to increased sedimentation during construction. Direct, long-term beneficial impacts to the Levisa Fork would result from stabilization of the Trimble and May Branches because of less erosion and sedimentation.	Minor indirect impacts due to increased sedimentation during construction activities.
	Terrestrial Habitat and Wildlife	No direct impacts to terrestrial habitat and wildlife. Indirect impacts as limited new development in the floodplain would occur and maintenance of existing development would continue to impact habitat and suppress area wildlife. A beneficial indirect impact could occur as continued flooding could lead to increased vegetation if flood damaged structures are not replaced.	*Nonstructural Areas:* No direct adverse impacts. Minor disturbances in the immediate vicinity of existing structures could occur. Evacuated floodplain areas could be allowed to undergo vegetative succession thereby increasing habitat diversity for many species. *Structural Areas:* Vegetation directly in the alignment of the floodwall (63 acres) would be permanently removed and would no longer provide habitat for terrestrial organisms.	*Nonstructural Areas:* No direct adverse impacts. Minor disturbances in the immediate vicinity of existing structures could occur. Evacuated floodplain areas could be allowed to undergo vegetative succession thereby increasing habitat diversity for many species. *Structural Areas:* Vegetation directly in the alignment of the floodwall (39 acres) would be permanently removed and would no longer provide habitat for terrestrial organisms.	No direct adverse impacts. Minor disturbances in the immediate vicinity of existing structures could occur. Evacuated floodplain areas could be allowed to undergo vegetative succession thereby increasing habitat diversity for many species.

		Alternative Plan 1 No Federal Action	Alternative Plan 2 Nonstructural plus Floodwall to BSCTC (Preferred)	Alternative Plan 3 Nonstructural plus Floodwall to Blackbottom	Alternative Plan 4 Nonstructural Program
ECOLOGICAL RESOURCES	Wetlands	No direct impacts. Indirect impacts from continued encroachment of humans on riparian habitats adjacent to Levisa Fork could negatively impact the limited wetland areas found in the Levisa Fork floodplain.	*Nonstructural Areas:* No direct or indirect impacts. *Structural Areas:* Approximately 0.06 acres of a 0.4-acre palustrine emergent wetland within proposed storage area for interior drainage during flood events. Potential beneficial effect to this wetland is anticipated.	*Nonstructural and Structural Areas:* No direct or indirect impacts	No direct or indirect impacts.
ECOLOGICAL RESOURCES	Threatened and Endangered Species	No direct impacts. Indirect impacts from continued encroachment of humans on riparian habitats adjacent to Levisa Fork could negatively impact habitat for special status species, including endangered Indiana bat.	*Nonstructural Areas:* Indirect positive impact as reduced development within the floodplain may improve riparian habitat for some special status species. *Structural Areas:* Potential direct, adverse impact to summer roosting and foraging habitat for the Indiana bat.		Indirect positive impact as reduced development within the floodplain may improve riparian habitat for some special status species.
CULTURAL RESOURCES	Architecture/ Historic Resources	No direct impact. Indirect impact to historic resources could be damaged by periodic floods.	*Nonstructural Areas:* During field investigations, some properties eligible for voluntary evacuation or floodproofing could be determined to be eligible for listing on the NRHP. *Structural Areas:* Several structures listed on the NRHP, as well as the Front Street Historic District, are within the general Prestonsburg structural area. Some potential that structural activities would occur within NRHP boundaries, although not affecting structures themselves.		*Nonstructural Areas:* During field investigations, some properties eligible for voluntary evacuation or floodproofing could be determined to be eligible for listing on the NRHP.
CULTURAL RESOURCES	Archaeological Resources	No direct impact. Indirect impact could occur if archaeological resources in areas where erosion would continue or new development in the floodplain.	*Nonstructural Areas:* Archaeological resources could be identified on properties eligible for the nonstructural programs. *Structural Areas:* Several structures listed on the NRHP, as well as the Front Street Historic District, are within the general Prestonsburg structural area and potential exists that archaeological resources could be identified.		Archaeological resources could be identified on properties eligible for the nonstructural programs.

Table 4-9. Comparison of Alternatives

Table 4-9. Comparison of Alternatives

		Alternative Plan 1 No Federal Action	Alternative Plan 2 Nonstructural plus Floodwall to BSCTC (Preferred)	Alternative Plan 3 Nonstructural plus Floodwall to Blackbottom	Alternative Plan 4 Nonstructural Program
HUMAN ENVIRONMNENT	Socio-economics and Community Cohesion	Recurring damages from major floods would limit the potential for future growth and economic development in Floyd County. The Prestonsburg residential and business district would not be offered flood damage reduction.	Plan would protect and preserve county center, the City of Prestonsburg through construction of a floodwall. A small number of construction jobs would be created during the 15-year nonstructural program. A portion of the displaced population would relocate to existing vacant structures or leave the area but most of the displaced population would be expected to remain in the area. Indirect impacts could include a weakening of the social network within the county and smaller neighborhood areas in particular.		Could have disruptive effect on City of Prestonsburg as some government functions and businesses are relocated. A small number of construction jobs would be created during the 15-year nonstructural program. A portion of the displaced population would relocate to existing vacant structures or leave the area but most of the displaced population would be expected to remain in the area. Indirect impacts could include a weakening of the social network within the county and smaller neighborhood areas in particular.
	Environmental Justice	No impact.	No adverse or disproportionate impacts.	No adverse or disproportionate impacts.	No adverse or disproportionate impacts.
BUILT ENVIRONMENT	Recreation	No impact. Flooding would continue to temporarily restrict access to River Park.	*Nonstructural Areas:* Long-term indirect benefit from additional greenspace in floodplain. *Structural Areas:* Short-term impact to recreational resources would occur at the athletic fields at Prestonsburg High School during construction. Indirect impact as reduce access to water. Gate closures would restrict access to River Park. Walking path at BSCTC would be relocated away from river.	*Nonstructural Areas:* Long-term indirect benefit from additional greenspace in floodplain. *Structural Areas:* Short-term impact to recreational resources would occur at the athletic fields at Prestonsburg High School during construction. Indirect impact as reduce access to water. Gate closures would restrict access to River Park.	Long-term indirect benefit from additional greenspace in floodplain.
	Aesthetic and Scenic Resources	No impact.	*Structural Areas:* View of Levisa Fork will be blocked in floodwall areas.		No impact.
	Hazardous, Toxic, and Radioactive Wastes	No direct impact.	*Nonstructural Areas:* Individual properties identified for demolition or nonstructural measures, such as ringwalls, will be evaluated for HTRW and any work necessary to address potential HTRW issues will be addressed prior to construction or demolition activities. *Structural Areas:* Prior to construction activities, each property affected would be evaluated for HTRW and any work necessary to address potential HTRW issues would be addressed prior to construction or demolition activities.		Individual properties identified for demolition or nonstructural measures, such as ringwalls, will be evaluated for HTRW and any work necessary to address potential HTRW issues will be addressed prior to construction or demolition activities.

Table 4-9. Comparison of Alternatives

		Alternative Plan 1 No Federal Action	Alternative Plan 2 Nonstructural plus Floodwall to BSCTC (Preferred)	Alternative Plan 3 Nonstructural plus Floodwall to Blackbottom	Alternative Plan 4 Nonstructural Program
BUILT ENVIRONMENT	Health and Safety	No direct impact.	*Nonstructural Areas*: Reduce the number of people threatened by flooding, stranding, drowning, or other safety issues. *Structural Areas:* The Prestonsburg High School and BSCT would be located adjacent to a construction staging area, the floodwall, a pump station, and ponding area. Increased dust, noise and vibration would be expected during construction activities and potential exists for children to be hurt on floodwall. Temporary safety issues at construction and borrow sites.	*Nonstructural Areas:* Reduce the number of people threatened by flooding, stranding, drowning, or other safety issues. *Structural Areas:* The Prestonsburg High School would be located adjacent to a construction staging area, the floodwall, a pump station, and ponding area. Increased dust, noise and vibration would be expected during construction activities and potential exists for children to be hurt on floodwall. Temporary safety issues at construction and borrow sites.	Reduce the number of people threatened by flooding, stranding, drowning, or other safety issues.
	Infrastructure	Substations, power lines and treatment plants would continue to be flooded, put out of service and damaged, costing money to restore service. Continued interruption of public services from flooding.	*Nonstructural Areas:* In the wider Floyd County nonstructural implementation area, minor direct effect on utilities would be caused by relocations. Some flooding damage to utilities could still occur. *Structural Areas:* Water, sewer, telephone, and cable lines would need to be relocated near the floodwall.		*Nonstructural Areas:* In the wider Floyd County nonstructural implementation area, minor direct effect on utilities would be caused by relocations. Some flooding damage to utilities could still occur.
	Traffic and Transportation	Flooding would continue to periodically interrupt access and restrict traffic.	*Nonstructural Areas:* Reduced levels of flooding would reduce access interruptions. *Structural Areas:* Gate closures would restrict traffic (including emergency vehicles) but less than traffic interruptions caused by high water. Temporary traffic constraints at construction and borrow sites.		Flooding would continue to periodically interrupt access and restrict traffic but at a slightly lesser level than No Action Alternative due to indirect benefits of nonstructural program.

4.6 Preferred Plan

The three viable alternatives identified above were evaluated by comparing each alternative to the Planning Objectives listed in Section 3.3. A brief narrative of each evaluation by objective is listed below.

<u>Most Cost Effective Plan.</u> Alternative Plan 2 was found to be the most cost effective alternative for providing comprehensive flood protection to the project area based on total cost and cost per unit protected. Plans 3 and 4 were more expensive than Plan 2 because of the acquisition costs for commercial structures and relocation costs for government owned structures otherwise protected by the longer floodwall.

<u>Reduce Financial Loss to Property Owners</u>. Each alternative other than the No Federal Action Alternative meets this objective because all are designed to protect to a minimum of the 1977 or one percent chance flood event level. Alternative Plans 2 and 3 would provide additional protection to roads and utilities in floodwall protected areas.

<u>Maintain Cultural Resources</u>. All alternatives were formulated to meet applicable Federal and state laws governing protection of significant historical or archaeological sites.

<u>Minimize Social/Economic Disruption</u>. Plan 1 would not disrupt any communities, but flood damages would continue. Implementation of Plan 2, 3, or 4 would result in some social and economic disruption for the City of Prestonsburg and for Floyd County. Plans 2 and 3 would have fewer long term impacts, but greater short term construction impacts on economic and social order would initially offset the advantage of protecting more structures in-place. Plan 4 could have long term impacts by removing all eligible commercial structures in the City of Prestonsburg from their present locations. Those commercial structures would be reestablished outside of the town or not rebuilt. The Prestonsburg High School would have to be relocated to a floodproofed site requiring extensive excavation and site preparation.

<u>Most Socially and Environmentally Acceptable Plan</u>. Alternative Plan 1, the No Federal Action Alternative has no direct impact on the environment, but provides no protection and does not meet planning objectives. Plans 2 and 3 have a greater impact on the environment but are the more socially acceptable plans as they protect the existing City of Prestonsburg in place. Plan 4 has limited environmental impact and is moderately socially acceptable.

Given the array of alternatives evaluated and their comparison with the planning objectives, protection of the project area by means of Plan 2, the structural alternative with a long floodwall extending to the BSCTC, is the most effective plan for reducing flood damages in the Phase I project area under the Section 202 program. This plan is composed of structural and nonstructural measures including a floodwall within the City of Prestonsburg, floodplain evacuation, floodproofing, relocation of public structures, an emergency evacuation plan, and continued enforcement of existing floodplain regulations.

4.7 Implementation Requirements – Preferred Plan

The project components recommended for implementation in this report require the cooperation and coordination of Federal, state and non-Federal agencies to be successful. The following paragraphs summarize the operation, maintenance, and management responsibilities of the non-Federal sponsor (Floyd County) that are expected to be contained in the PCA.

a. Provide a share of the total project costs allocated to flood control as further specified below:

   (1) Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocation determined by the Federal Government to be necessary for the construction, operation, and maintenance of the project;

   (2) Provide retaining dikes, waste weirs, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project; and

   (3) Provide, during implementation, any additional costs as necessary to make its total contribution to the total project costs allocated to flood control.

b. For so long as the project remains authorized; operate, maintain, repair, replace, and rehabilitate the completed project or functional portion of the project, at no cost to the Federal Government except as authorized by PL 84-99, in accordance with applicable Federal and State laws and any specific directions prescribed by the Federal Government in accordance with CFR Title 33, Part 208.10.

c. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon land that the non-Federal sponsor owns or controls for access to the project for the purpose of inspection and, if necessary after failure to perform by the non-Federal sponsor, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project.

d. Hold and save the United States free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the United States or its contractors.

e. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 CFR, Section 33.20.

f. Perform, or cause to be performed, any investigations for hazardous substances as are determined necessary to identify the existence and extent of any hazardous substances regulated under CERCLA, 42 USC 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for the operation, maintenance, repair, replacement and rehabilitation of the project. However, for lands that the Federal Government determines to be subject to the navigation servitude, only the Federal Government shall perform such investigations unless the Federal Government provides the non-Federal sponsor with prior specific written direction, in which case the non-Federal sponsor shall perform such investigations in accordance with such written direction.

g. Assume complete financial responsibility, as between the Federal Government and the non-Federal sponsor, for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for the operation, maintenance, repair, replacement, or rehabilitation of the project.

h. As between the Federal Government and the non-Federal sponsor, the non-Federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability. To the maximum extent practical, operate maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA.

i. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, PL 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (PL 100-17), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way required for the operation maintenance repair, replacement, and rehabilitation of the project, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act.

j. Comply with all applicable Federal and State laws and regulations including, but not limited to, Section 601 of the Civil Rights Act of 1964, PL 88-352 (42 USC 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army, and Section 402 of the Water Resources Development Act of 1986, as amended (33 USC 701b-12), requiring non-Federal preparation and implementation of floodplain management plans.

k. Provide a share of the total cultural resources preservation, mitigation and data recovery costs attributed to flood control that are in excess of one percent of the total amount authorized to be appropriated for flood control.

l. Participate in and comply with applicable Federal floodplain management and flood insurance programs.

m. Prescribe and enforce regulations to prevent obstruction of or encroachment on the project that would reduce the level of protection it affords or that would hinder operation and maintenance of the project.

n. Not less than once each year, inform affected interests of the extent of the protection afforded by the project.

o. Publicize floodplain information in the area concerned and provide this information to zoning and other regulatory agencies for their use in preventing unwise future development in the floodplain and in adopting such regulations as may be necessary to prevent unwise future development and to ensure compatibility with protection levels provided by the project.

p. Comply with Section 221 of Public law 91-611, as amended, and Section 103 of PL 99-662, as amended, which provides that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until the non-Federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element.

q. Provide and maintain necessary access roads, parking areas and other public use facilities, open and available to all on equal terms.

r. Not use Federal funds to meet the non-Federal sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is expressly authorized by statute.

4.7.1 Plan Components (Including Mitigation)

Alternative Plan 2 is the most cost-effective, technically feasible plan which satisfies the established planning objectives described in Chapter 3. Alternative Plan 2 is a comprehensive flood damage reduction plan which includes:

- a floodwall for Prestonsburg
- a voluntary floodproofing and floodplain evacuation program for eligible structures outside Prestonsburg
- a revised emergency evacuation program based on the Levisa Fork flood warning system
- continued participation in the NFIP by county and municipal governments

Table 4-10 summarizes environmental commitments made in this document necessary to mitigate for unavoidable impacts to the physical, natural, and human environments. Should Alternative Plan 2 (the Preferred Alternative) be selected for implementation, all of the mitigation features shall be included in construction specifications for floodwall construction.

Table 4-10. Summary of Environmental Commitments and Mitigation Measures

Section	Resource	Mitigation
6.2	Land Use	See Ecological and Socioeconomic Resources
6.3	Aesthetic and Scenic Resources	The following measures would be employed where applicable and feasible: • Incorporation of wall graphics to transform the wall into a community "work of art" capturing the history or spirit of its residents • Incorporation of wall texture • Incorporation of plant material, where appropriate, to buffer and enhance views of the floodwall • If possible, construction of residential structures within close proximity of neighborhoods impacted by the floodwall to maintain overall visual continuity • Incorporation of sidewalks and door openings along the floodwall, where feasible, to allow continued viewing access and use of the Levisa Fork
6.4	Topography, Geology and Soils	Best Management Practices (BMPs) would be implemented to minimize the effects of erosion during construction activities. Localized drainage issues arising from soil removal in borrow areas would be addressed during the design process. See also Ecological Resources and Aesthetic and Scenic Resources. Good engineering practice and standard erosion control procedures would be implemented to minimize the effects of erosion during construction activities.
6.5	Air Quality	Construction would be performed in accordance with the State Implementation Plan and in compliance with applicable Kentucky Division for Air Quality and local requirements. The following actions would be used to minimize off-site air emissions and air quality impacts associated with construction activities: • Cover dump trucks when hauling soil on main highways. • Maintain trucks to prevent excess emissions. • Shut down heavy equipment when not needed. • Use water or approved chemical spray to suppress dust on roads, materials stockpiles, demolition areas, and other surfaces as required. • Utilize silt fences to contain soil in the construction zone. • Clean excess soil from heavy equipment and trucks leaving the construction zone to prevent off-site transport. • Conduct asbestos inspections of each structure identified for demolition. • Special handling and removal of asbestos-containing materials to prevent release of asbestos fibers. • Maintenance of paved roadways in a clean condition.
6.6	Noise	Construction would be performed in accordance with and in compliance with applicable USACE and local requirements. The following actions would be used to minimize noise impacts to sensitive receivers in the implementation area: • Limit, to the extent possible, construction and associated heavy truck traffic between 9 p.m. and 7 a.m. • Shield noisy stationary equipment such as generators and compressors with acoustic barriers to reduce noise levels from such equipment. • Locate stationary equipment as far away from sensitive receivers as possible. • Select material transportation routes as far away from sensitive receivers as possible. • Equip construction equipment engines with adequate mufflers, intake silencers, and/or engine enclosures to reduce noise levels by 5 to 10 A-weighted sound level in decibels (dBA). • Shut down noise-generating heavy equipment when it is not needed. • Maintain noisy equipment per manufacturer's recommendations. • Require construction personnel to operate equipment in the quietest manner possible (e.g., speed restrictions, retarder brake restrictions, engine speed restrictions, etc.). • Complete as much as possible of the floodwall near Prestonsburg High School and the BSCTC during the school summer recess to avoid impacts to school function. • Perform construction activities off-site to the maximum extent feasible (e.g., fabricate concrete forms, etc.). • Route heavy truck traffic away from sensitive receivers to the extent possible.

Table 4-10. Summary of Environmental Commitments and Mitigation Measures

Section	Resource	Mitigation
6.7	Water Resources	See Ecological Resources
6.8	Ecological Resources	Water Resources and Aquatic Resources: • BMPs would be implemented to minimize soil erosion, spills, and leaks during construction. • In-lieu fee compensation would be paid to mitigate for loss of project-related Ecological Integrity Units (EIU) for May and Campus Branches. For the Levisa Fork, either in-place mitigation or in-lieu fee compensation is planned. Appropriate mitigation will be developed in conjunction with regulatory agencies before the Final EIS. Terrestrial Resources After construction, seedlings and seeds from appropriate tree, shrub, and herbaceous plant species would be obtained. Upon completion of a final species list, information on the care needed for each species during storage, transportation, and post-planting would be obtained and incorporated into the planting plan. Planting locations would be chosen to most appropriately accommodate the optimum habitat for each particular species within the corridor (e.g., river's edge, bank, and upland bank slope). For example, less flood tolerant species would be planted along the upland slope of the river's bank (e.g., hard mast species). The target success rate for the mitigation areas will be 300 stems per acre; therefore initial planting may be significantly higher depending on the survivability of the initial plant stock obtained. In order to achieve target success rate and habitat quality of a mature riparian corridor, monitoring will be necessary. Monitoring of vegetation would be initiated immediately after the initial planting of the terrestrial mitigation areas and would continue for five years, with annual reporting on the condition of vegetation. During this time period, invasive species would be monitored and managed to ensure the survivability of the replanted species to the target success rate. Monitoring and management of the mitigation areas would be the responsibility of the local sponsor. However, the USACE will assist in the monitoring of these areas during routine monitoring of other function aspects of the flood control project. Any concerns regarding the mitigation areas would be promptly reported to the local sponsor. Should the local sponsor take no action during their 5 year period of responsibility, the USACE would perform management activities as appropriate to ensure target mitigation habitat is achieved, subject to the availability of funds. Threatened and Endangered Species (Indiana bat) The USACE, in consultation with the USFWS and KDFWR, plans to conduct needed clearing activities during winter months (November 15 through March 31) to avoid potential direct impact (i.e., injury) to the Indiana bat. If tree removal would be required outside of this time frame, the USACE will coordinate with the USFWS and KDFWR to ensure the necessary precautions are implemented to avoid impact to the Indiana Bat. Wetlands No adverse effects to wetland are anticipated, and no mitigation would be required. Should the project plans change to adversely affect this wetland, or if project limits change to affect additional wetlands, additional documentation and permitting would be required. A formal wetland survey and delineation would be completed, with formal wetland boundaries used to establish buffer zones to avoid impacts if possible. A detailed mitigation plan, if needed, would be prepared.
6.9	Cultural Resources	The Programmatic Agreement sets forth the agreed-upon procedures the USACE would need to follow prior to implementation of a selected alternative in order to satisfy USACE's Section 106 responsibilities for all individual project undertakings.
6.10	Socioeconomic Resources	Potential mitigation measures to address a shortage of decent, safe, and sanitary relocation housing, if needed, would be considered on a case-by-case basis. Since the nonstructural portion of this alternative would address only 10-15 structures per year, it is anticipated

Table 4-10. Summary of Environmental Commitments and Mitigation Measures

Section	Resource	Mitigation
		that market forces would be sufficient to create the bulk of available relocation housing. Mitigation measures would more likely be needed for the structural portions of the project because relocations would be mandatory and shorter in duration. In accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (PL 91-646)*, as amended, residential and nonresidential property owners determined to be eligible only for floodplain evacuation would be offered the fair market value for their property (structure and land). In addition to the fair market value of the property, residential owners are offered standard relocation benefits under P.L. 91-646 to assist in the purchase of a comparable replacement home located out of the April 1977 floodplain area. Displaced persons, including those who rent, would also be compensated for eligible moving expenses. These individuals could relocate to similar housing within Floyd County as available. If comparable replacement dwellings are not available in the implementation area, the last resort housing provisions of Section 206, P.L. 91-646 would be implemented project-wide, on a case-by-case basis, utilizing the most feasible, cost-effective method available. This provision could include making payments in excess of those authorized by Sections 203 and 204 of P.L. 91-646. For residents eligible for raise-in-place protection who are not able to climb stairs, other alternatives could include: ramps; chairlifts; and elevators. Where stair alternatives are not feasible, special consideration would be given on a case-by-case basis. The USACE would relocate the walking path at BSCTC.
6.11	Hazardous, Toxic and Radioactive Wastes	Prior to construction activities, each property affected by the Proposed Action will be evaluated for HTRW and any work necessary to address potential HTRW issues will be addressed prior to construction or demolition activities. Solid non-hazardous waste generated by project implementation would be disposed of at a licensed landfill.
6.12	Health and Safety	The USACE would coordinate with local officials and public safety departments (police, fire, health), as well as utility providers prior to construction to minimize disruptions and hazards during and after construction.
6.13	Infrastructure	Ongoing coordination with local utility providers and local jurisdictions would allow sufficient planning time to avoid utility short-term disruptions and long-term capacity or distribution issues. In addition, the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (PL-91-646) and ER 1165-2-117 *Responsibility for Costs of Improved Standards in Highway and Housing Relocations* would allow for floodproofing activities on individual structures to include measures to upgrade substandard water and sewer utility connections. Ongoing coordination with local and state officials and transportation utility providers would allow sufficient planning time to minimize short-term disruptions and long-term capacity or distribution issues. A traffic maintenance plan would be prepared by the USACE or its construction contractor prior to construction, in coordination with local jurisdictions and emergency service providers. Traffic detours, road closings, and other necessary traffic maintenance measures would be prominently posted and also provided to local newspapers in advance. Access would be maintained for residents during construction. A hauling plan would be prepared by the USACE or its construction contractor prior to construction. This plan would specify haul routes for soil, rock, and other construction materials. If necessary per the hauling plan, restrictions on hours of hauling would be specified. The plan would be coordinated with local and county government during its development.

4.7.2 Local Betterments

A betterment is an improvement made to a piece of property that increases its value, rather than a repair that simply maintains its current value. No betterments are included in the preferred plan.

4.7.3 Operations, Maintenance and Replacement Considerations

Subject to the terms of the PCA, the sponsor is required to provide an annual report to the USACE – Huntington District on the compliance with the flood damage reduction project objectives by the program participants. This would require the Floyd County Floodplain Coordinator to complete the report on behalf of Floyd County.

Annual Operation and Maintenance (O&M) costs for the floodwall are estimated at $100,000 and include labor costs for periodic inspections, routine maintenance and equipment replacement as required in the project maintenance manual. The costs for the Floyd County Floodplain Coordinator are minimal since the Coordinator was previously tasked with inspection requirements for the county's participation in the NFIP. Floyd County recognizes its responsibility to prepare the report and has agreed to furnish this report to the District on an annual basis.

Each floodproofed structure will have a Floodproofing Agreement recorded in County land records including provisions for the prohibition of living space development in floodprone spaces created by the floodproofing process. Floyd County will assume the responsibility to assure that each structure owner properly maintains the floodproofing features of the structure and also complies with all requirements of the county floodplain ordinances. Floyd County will provide annual certification to the USACE that the items of O&M regarding floodproofed structures have been addressed per the PCA and the floodproofing agreements.

It will be the responsibility of the non-Federal sponsor to determine the appropriate use of lands evacuated as a part of the floodplain acquisition program in its floodplain management program. Appropriate deed restrictions will be recorded on those lands deemed to be excess to the project purposes and sold by the local sponsor. These deed restrictions will restrict development in the floodplain and prevent development in the floodway of the April 1977 or one percent chance event, whichever it higher.

4.7.4 Fully Funded Cost Estimate

The Fully Funded Cost Estimate is still being developed, and will be provided in the Final EIS.

4.7.5 Cost Apportionment

This project is subject to the cost-sharing requirements of PL 99-662 (the 1986 Water Resources Development Act). Any flood control project or separable element subject to the cost-sharing provisions of PL 99-662 requires an "Ability-to-Pay" determination in accordance with Section 103(m) of the Act. Floyd County's ability-to-pay will be determined using project benefits (benefits test) and State and County per capita income (income test) as outlined in ER 1165-2-121 to determine the maximum possible reduction in the level of non-Federal cost sharing for the project. The apportionment of project costs will be included in the DPR-1/FEIS.

4.7.6 Views of Non-Federal Sponsors and Any Other Agencies Having Implementation Responsibilities

The primary local governmental body associated with the project is the Floyd County Fiscal Court. The Fiscal Court Board has shown a high level of interest in the project, and is fully expected to do so throughout the life of the project. In its role as non-Federal sponsor for the project, the Fiscal Court has become familiar with the project formulation and implementation processes.

The basic requirements of a PCA were explained to the Judge Executive of the Fiscal Court. The Fiscal Court was briefed and is fully aware of the responsibilities associated with the project including implementation, operation, and maintenance. The Fiscal Court is committed to implementing the project and a Letter of Intent (LOI) will be provided with the DPR-1/FEIS.

CHAPTER 5. AFFECTED ENVIRONMENT

This Chapter describes existing baseline conditions in Floyd County, with emphasis on those resources potentially impacted by the Proposed Action and alternatives. Within this Chapter, "the project study area" generally refers to the area encompassed within DPR-1, DPR-2, and DPR-3, the area within the Levisa Fork floodplain and its tributaries in Floyd County that would be affected by a recurrence of the April 1977 flood event. Greater emphasis is placed on areas within the City of Prestonsburg, Kentucky potentially affected by structural components of Alternative Plans 2 or 3 because of the relatively greater impact to existing resources.

Chapter 6.0, *Environmental Consequences*, identifies potential direct, indirect, and cumulative effects of the identified project alternatives on each of the issue areas presented in this chapter. Chapter 6.0 also contains mitigation measures that, when implemented, would reduce the level of identified impacts to acceptable levels.

5.1 Geographic Setting

Floyd County is located within the Appalachian Mountains of Eastern Kentucky, in the watershed of the Levisa Fork of the Big Sandy River (See **Figure 1-2**, Section 1.5.1). The study area includes those floodplain areas that would be affected by a recurrence of the April 1977 flood within the Levisa Fork basin and the boundaries of Floyd County, Kentucky. The study area, primarily residential in nature, includes incorporated areas of Prestonsburg, Allen, Wayland, and Wheelwright, and unincorporated areas of Floyd County subject to flood damage from the potential recurrence of flooding similar to that which occurred in April 1977. Flood damage reduction for the City of Martin is being implemented separately, and is not included in this Proposed Action. Also included in the geographic scope of the Proposed Action study area are the floodplain areas located along tributaries of the Levisa Fork that would be affected by backwater flooding from a recurrence of the April 1977 flood.

5.2 Climate

The climate of Floyd County is typical for the Dissected Appalachian Plateau subregion of the Central Appalachian Ecoregion. The subregion has four distinct seasons, with approximately 160 to 190 mean annual frost-free days. Summers are very warm in the valley with milder temperatures in higher elevations. Summer temperatures are on average between 52 Fahrenheit (°F) (minimum) and 87°F (maximum). The highest recorded temperature was 102°F, which occurred on August 21, 1983 (Natural Resources Conservation Service (NRCS) 2000). Winters are cold and have a moderate amount of snow, although valley bottoms have intermittent thaws that preclude long-lasting snow cover. Mean temperatures in the winter range from 18°F (minimum) to 48°F (maximum). Spring and Autumn typically allow for a smooth transition between the seasons. Normal annual precipitation is adequate for crops. Mean annual precipitation ranges from 41 to 55 inches in this subregion (USGS, 2002) and approximately 48 inches in Floyd County. Average seasonal snowfall is 25 inches, while the greatest snow depth at any time during the period of record was 16 inches. The prevailing wind is from the south with the highest average wind speeds (approximately 10 miles per hour) in the spring (NRCS 2000).

5.3 Land Use

Land use includes natural conditions or human-modified conditions and activities occurring at a particular location. Human-modified, land use categories include residential, commercial, industrial, transportation, communications, utilities, agricultural, institutional, recreational, and other developed use areas. Management plans and zoning regulations determine the type and extent of land use allowable in specific areas and are often intended to protect specially designated or environmentally sensitive areas. Land uses discussed in this document include the following:

- *Agricultural* – includes cropland, tree nurseries, grazing land, pastures, orchards, and other agricultural uses.
- *Commercial* - includes retail stores, shops, hotels/motels, gas stations, auto dealerships, convenience stores and access, parking, loading and delivery areas.
- *Forest* – includes undeveloped forested land.
- *Industrial* - includes manufacturing, resource extraction and processing facilities, handling and storage facilities, and associated parking, circulation, loading and other outdoor work areas.
- *Institutional* - includes public buildings, such as schools and adjacent athletic fields, fire stations, state highway facilities and military uses.
- *Recreational* – includes parks, playgrounds, trails, and other recreational land uses.
- *Residential* - includes single family and multi-family residential structures, driveways, house gardens, and surrounding maintained landscapes.
- *Riparian Corridor* – includes a vegetated corridor of variable width along major streams, including the Levisa Fork and tributaries.
- *Transportation* – includes roadway, interstates, rail lines, airports and other transportation corridors.
- *Utilities* – includes power plants, transmission corridors, pipelines, substations and other utility-related land use.
- *Water courses* – includes streams, rivers, lakes, wetlands, etc.

5.3.1 Levisa Fork Basin

The Levisa Fork Basin includes approximately 2,236 square miles of land in KY and VA. The basin includes all or portions of Pike, Floyd, Johnson, Knott, Magoffin, Morgan, and Lawrence Counties, KY and Dickenson, Wise and Buchanan Counties, VA. The basin is primarily a rural landscape interspersed with small to medium-sized communities throughout the river valley. The six major land use categories within the basin are forest, urban, mining, agriculture, residential, and industrial. Forests cover approximately 80 percent of the basin.

Urban land parcels within the basin are small and scattered relative to forested land. Approximately ten percent of the land is suitable for urban development, except most of that land is located within the 100-year floodplain. Urban land uses include commercial, industrial, institutional, residential, transportation, recreational (city parks), and other developed parcels.

Within the Levisa Fork basin, a substantial number of acres have been mined for coal over the years, particularly in Pike, Floyd, and Johnson Counties, KY. Deep mining became unprofitable in the late 1940s, and strip-mining gained prominence. (Kleiber, 1992) Mining and associated reclamation activities have resulted in ongoing pollution of the Levisa Fork and many of its tributaries.

Agricultural uses account for approximately five percent of the land parcels within the basin. These parcels are predominantly located in Floyd, Johnson and Lawrence Counties in KY. Little or no commercial crop production occurs, and many farms have been abandoned over the past 30 years.

Industrial development within the basin has been hampered by the limited amount of developable, flood-free land and efficient transportation, and is not a major land use category. Existing industries include sawmills, mining equipment fabrication and assembly, and small service companies.

Commercial use parcels are generally clustered along major roads. These commercial areas are often in or near the floodplain, where population density is highest.

The largest institutional land (land for federal, state and local government uses) parcels within the basin have educational and transportation (county and state) facilities located upon them. Institutional land in Floyd County also includes other city and county offices and services such as police and fire stations.

The basin has few restrictions on land use. Local floodplain management ordinances and floodplain zoning regulates construction within the floodplain. Federal and state project-regulated land uses include USACE flood control lakes and state parks. The Big Sandy Area Development District (BSADD), which encompasses Floyd, Johnson, Magoffin, Martin and Pike Counties, is responsible for area-wide planning in eastern Kentucky.

5.3.2 Floyd County

Land use in Floyd County is similar to that in the watershed as a whole, with the majority of land undeveloped. All cities and communities are located within the valleys. Major cities and communities within Floyd County include Prestonsburg (County seat), Auxier, Allen, Emma, Dwale, Tram, Harold, Betsy Layne, Martin, Wayland, Wheelwright, Minnie, Langley, McDowell, and Garrett.

Floyd County is comprised of 251,494 land acres and 1,728 water acres for a combined acreage of 253,222 (NRCS 2000). Most acreage in the county is forested, either privately owned or government-held. The privately-held forest includes several large land tracts owned by mining companies. Approximately five percent of the land within the county has been strip-mined for coal.

Crop cultivation throughout the county has always been limited because of the small supply of flat land for crop cultivation. Since the early 1920's land devoted to farming has decreased by 96 percent in Floyd County, mostly from residential and commercial development. In 2002, Floyd County had a total of 68 farms using 6,723 acres of farmland compared with a total of 3,216 farms using 175,656 acres of farmland in 1924. Of this, total cropland comprised 1,003 acres and 82,453 acres in 1997 and 1924, respectively. (USDA, 2005 Kentucky Agricultural Statistics 2004-2005 Bulletin).

5.3.3 Local Zoning

The only local land use zoning is in the City of Prestonsburg. Prestonsburg zoning regulations are included within the Prestonsburg Subdivision Regulations and Zoning Ordinance, effective March 22, 1999. The following land use zones are found within the general vicinity of proposed structural components in Prestonsburg:

- C-1: Neighborhood Commercial District
- C-2: General Business District
- C-3: Central Business District
- P-2: Park with Facilities
- R-1: Single and Double Family Dwellings
- R-2: Single Double and Multiple Family Dwellings
- R-3: Double and Multiple Family Dwellings

5.3.4 Soil Borrow Areas

Three soil borrow areas, designated as Spurlock Creek Granny Fitz, and PB-2, have been identified for construction of the floodwall alternatives (see **Figure 5-1**). No rock borrow areas have been identified. If rock borrow is needed, it will be obtained through commercial sources.

- The Spurlock Creek site is located before Compton Bridge Rd. off of Route 122. The site consists of a mowed field with Spurlock Creek running down the center of the field. A very narrow riparian fringe borders the stream (approximately 3 feet on each side). The small creek is highly impacted, evidenced by downcutting and obvious water quality impairment (gray and red water), with little flow.
- The 15-acre Granny Fitz borrow area is a mowed field with a small creek bordering the area and then bisecting the area. Granny Fitz Branch is a small

stream bordering the southern side of the open field, flowing along the base of an adjacent slope. The site is within a residential area.

- The PB-2 land use includes upland pine forests along the lower slopes of the mountain and upland hardwood forests along the upper slopes. A roadway goes through the center of the area. Disturbed land is located along roadway that includes a dump (e.g., vehicles and trash).

5.4 Visual and Aesthetic Resources

Visual resources are defined as the natural and manufactured features that comprise the aesthetic qualities of an area. These features form the overall impression that an observer receives of an area or of its landscape character. Landforms, water surfaces, vegetation, and manufactured features are considered characteristic of an area if they are inherent to the structure and function of a landscape.

As is common in eastern KY, Floyd County has numerous scenic viewsheds, wildlife habitat, and natural forestland. The Jefferson National Forest is located in the southern portion of Pike County, which borders Floyd County to the east. Additional wildlife management areas within 50 miles of Floyd County include Fishtrap Lake, Paintsville Lake, Addington Enterprises, Grayson Lake State Park, Yatesville Lake State Park, Carr Creek State Park, Pine Mountain Trail State Park, Breaks Interstate Park, and Laurel Lake Wildlife Management.

The entire length of US 23 within Floyd County is part of the KY Scenic Highway and National Scenic Byways Program and is designated as the Country Music Highway. The National Scenic Byways Program, established by Congress in 1991, is administered by the U.S. Department of Transportation's Federal Highway Administration (FHWA).

The City of Prestonsburg is known as the "Star City of Eastern Kentucky." The star represents the city's location at the center of five major roadways: US 23 North, US 23 South, KY 80, KY 3 and KY 114. Visual resources within Prestonsburg include various historic buildings, especially in its downtown area, and the historic West Prestonsburg Bridge. No significant visual resources are located within the three borrow areas.

Floyd County, the City of Prestonsburg, and other local cities/communities do not have comprehensive plans, transportation plans, or development regulations that establish goals for scenic preservation or contain guidelines or recommendations to limit the visual impacts of development.

5.5 Topography, Geology and Soils

5.5.1 Topography

5.5.1.1 Region

The physiographic regions of KY are shown in **Figure 5-2**. The Levisa Fork Basin is part of the Eastern KY Coal Fields Physiographic Region and the Central Appalachians - Dissected Appalachian Plateau Ecoregion. The Coal Fields physiographic region covers the eastern end of the state, stretching from the Appalachian Mountains westward across the Cumberland Plateau to the Pottsville Escarpment.

The Central Appalachian ecoregion, stretching from central Pennsylvania to northern Tennessee, is primarily a high, dissected, rugged plateau composed of sandstone, shale, conglomerate, and coal. The rugged terrain, cool climate, and infertile soils limit agriculture, resulting in a mostly forested land cover. The high hills and low mountains are covered by a mixed mesophytic forest with areas of Appalachian oak and northern hardwood forest. Bituminous coal is common, the mining of which has caused siltation and acidification of streams.

The Levisa Fork River system, a tributary of the Big Sandy River, is the major surface water drainage feature in the Levisa Fork Basin. The Levisa Fork Basin encompasses approximately 2,326 square miles and is approximately 164 miles long. The Levisa Fork and its tributaries are typical of most Appalachian rivers in that they have frequent, extreme fluctuations in flows due to either large regional weather patterns or short duration thunderstorm activities. The basin, like the Eastern KY Coal Fields physiographic region of which it is a part, is characterized by moderate to steep sided ridges and deep, twisting, narrow valleys. Vertical relief ranges from 100 feet at the mouth of the Levisa Fork near Louisa, KY to 1,600 feet in the Breaks area of the Russell Fork near the VA border, approximately 106 miles upstream. Flat and moderately sloped areas are located within or adjacent to river floodplains (USACE, 1998).

5.5.1.2 Floyd County

Topography within Floyd County consists of steep, rugged, sharp-crested mountains separated by deep coves and narrow valleys. The only flat land in the county is found in the narrow valleys of the Levisa Fork and its tributaries. The study areas are found within the narrow valleys of the floodplain. Floyd County ranges in elevation from 580 feet AMSL at the point where the Levisa Fork enters Johnson County to 2,320 feet AMSL within the southern region of the county. Ridge top elevations range from 1,200 to 1,300 feet AMSL in the northern area of the county to 2,000 feet AMSL in the southern region. Local reliefs are commonly 600 feet, and can be as great as 900 feet within Floyd County (KY Geological Survey (KGS) 2001).

Phase 1. The elevation in Prestonsburg and the community of Auxier ranges from approximately 600 to 630 feet AMSL. Elevations range between 650 feet and 935 feet AMSL in the PB-2 borrow area, between 600 feet and 650 feet AMSL in Granny Fitz, and 580 feet to 650 feet AMSL in the Spurlock Creek area.

Phase 2. The second phase of the project lies mainly along the Levisa Fork. Elevations range from a minimum of 650 feet in the city of Allen to a maximum of 671 feet AMSL in the Betsy Layne community. Elevations tend to decrease within this study area proceeding downstream along the Levisa Fork.

Phase 3. The third phase of the project lies mainly within the Right and Left Forks of Beaver Creek, a tributary of the Levisa Fork. In the city of Martin where Beaver Creek divides into the right and left fork, the elevation is 640 feet AMSL. Along the Right Fork Beaver Creek, elevations in Langley and Wayland are 650 feet and 714 feet AMSL, respectively. The Left Fork Beaver Creek travels through McDowell (707 feet AMSL) and Wheelwright (1,102 feet AMSL), which lie at much higher elevations than the other regions of the study area.

5.5.2 Geology

5.5.2.1 Region

The eastern portion of KY lies within the Eastern KY Coal Fields region, which is part of the larger Cumberland Plateau region of the eastern United States. The Eastern KY Coal Field region is characterized by relatively flat-lying layers of alternating sequences of Pennsylvanian Breathitt Group sedimentary rocks. Beds of sandstone in the Breathitt Formation range from 30 to 120 feet thick and typically make up approximately 50 percent of the total thickness of the formation (USGS 1995). Major water yields primarily occur within the sandstone layers of this formation. The Pennsylvanian rocks are 1,500 to 4,000 feet thick within Floyd County (USGS 1995).

Seismic activity in Eastern KY is generally not significant. Most of the significant seismic activity recorded in KY has historically occurred in the western part of the state, near the Mississippi River.

5.5.2.2 Floyd County

The geology of the county is composed entirely of the Pennsylvanian Breathitt Formation, which is composed of inter-bedded sandstone, shale, siltstone, and coal beds. The bedded sandstone in the area provides protection for the caps, while the valley slopes consist of clay, shale, and coal beds. The streams form in the more erodible materials. The geology of the area tends to result in narrow valleys with steep valley slopes (NRCS 2000).

The chief mineral resource in the area is coal. Floyd County falls within the Martin Coal Production District of the Eastern KY Coal Field. In 2002, there were 32 underground mines and 15 surface mines within the county that produced approximately 2 million tons and 1 million tons of coal, respectively. An estimated 3 to 5 billion tons of remaining coal resources are still available for mining (KY Department of Mines and Minerals 2002). The majority of coal mines within Floyd County occur in the southern regions of the county.

5.5.3 Soils

5.5.3.1 Floyd County

The Soil Survey of Floyd and Johnson County, KY, published by the NRCS in 2000 details the soil types found in the area.

General county soil characteristics are classified into simplified soil map units that have a distinctive pattern of soils, relief and drainage. Generalized soil map units are named by major soil types within the area. The unit Hazelton-Redscreek-Dekalb-Marrowbone is characteristically found in the northern and western half of the county on crests, mountainsides, benches, and coves. Slopes range from 20 to 80 percent. Hazleton-Sharondale-Dekalb-Marrowbone is similar to the first map unit in characteristics. However, it is located predominately in the southern and eastern half of Floyd County. The Grigsby-Udorthents-Shelocta complex, found in only 6 percent of the county, is found primarily on floodplains and in reconstructed valleys along the major tributaries of the Levisa Fork. Slopes range from 0 to 15 percent. Finally, the Allegheny-Nelse-Udorthents unit, comprising only one percent of all soils in Floyd County, is found along the broad valleys of the Levisa Fork with slopes ranging from 0 to 25 percent. Soils within these map units are all typically very deep, well-drained soils with loamy underlying subsoil (NRCS 2000).

5.5.3.2 Prime Farmland and Hydric Soils

Prime farmlands are monitored by the United States Department of Agriculture (USDA) NRCS to ensure the preservation of agricultural lands that are of statewide or local importance. Soils designated as prime farmland are capable of producing high yields of various crops when managed using modern farming methods. Unique farmlands are also capable of sustaining high crop yields and have special combinations of favorable soil and climate characteristics that support specific, high-value food or crops. Designation of such lands is based on which soil type is present. Soil types qualifying as prime or farmlands are identified by the NRCS.

Approximately six percent of soils meet the requirements for prime farmland in Floyd County. This prime farmland is located within the floodplains of the Levisa Fork and its tributaries. The majority of prime farmland is used for grazing (pastures) and animal food production (hay), although a portion is used for growing corn. Soil map units identified as prime farmland within Floyd County (NRCS 2000) are found in **Table 5-1**.

Hydric soils are defined as soils that have formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the subsurface. In addition, hydric soils are typically associated with wetland areas. According to the NRCS, approximately six percent of the soils in Floyd County have been identified as being hydric or as having hydric components (NRCS 2005).

Table 5-1. Prime Farmland and Hydric Soil Units within Floyd County					
Map Unit Symbol	**Map Unit Name**	**Slope**	**Hydric Soil**	**Prime Farm-land**	**Description**
AbB	*Allegheny loam*	*2 to 6 percent*	No	**Yes**	This soil is very deep, gently sloping, and well drained. It occurs on stream terraces and alluvial fans along the Levisa Fork. The soil is medium in natural fertility and moderate organic content making it well suited for cultivated crops, hay and pasture, and woodland.
AeB	*Allegheny Loam*	*2 to 6 percent*	No	**Yes**	This soil is very deep, gently sloping, and well drained. It occurs on stream terraces and alluvial fans along the tributaries of the Levisa Fork. The soil is medium in natural fertility and moderate organic content making it well suited for cultivated crops, hay and pasture, and woodland.
ChB	*Chavies fine sandy loam*	*2 to 6 percent*	No	**Yes**	This soil is very deep, gently sloping, and well drained. It occurs on stream terraces along the Levisa Fork and its tributaries. The soil is medium in natural fertility and moderate organic content. These soils are mainly used for cultivated crops, hay, and pasture.
Co	*Cotaco loam*	*0 to 4 percent*	**Yes**	**Yes**	This soil is very deep, nearly level and gently sloping, and a moderately well drained to somewhat poorly drained soil. It occurs on stream terraces along the Levisa Fork. The soil is medium in natural fertility and moderate organic content. These soils are mainly used for hay and pasture.
Gr	*Grigsby fine sandy loam*	*0 to 4 percent*	No	**Yes**	This soil is very deep, nearly level and gently sloping, and well drained. It occurs on the flood plains of the Levisa Fork tributaries. The soil is high in natural fertility and moderate organic content. Soils are mainly used for cultivated crops, hay, and pasture.
Kn	*Knowlton silt loam*	*0 to 2 percent*	**Yes**	**Yes**	This soil is very deep, nearly level, and poorly drained. It occurs on stream terraces along the Levisa Fork and its tributaries. Medium in natural fertility and low in organic content. Mainly used for pasture and hay.
PsC	*Potomac-Shelocta-Grigsby*	*2 to 15 percent*	**Yes**	No	This complex consists of deep and very deep, gently sloping to moderately steep, somewhat excessively drained and well drained soils on flood plains, colluvial fans, and foot slopes. These soils are typically found in narrow valleys in the southern portion of the County.
ShC	*Shelocta-Grigsby-Stokly complex*	*2 to 15 percent*	**Yes**	No	This complex consists of deep and very deep, gently sloping to moderately steep, well drained and somewhat poorly drained soils on floodplains, colluvial fans, and foot slopes. These soils are typically found in narrow valleys within the northern and central portions of the County.
St	*Stokly fine sandy loam*	*0 to 3 percent*	**Yes**	**Yes**	Very deep soil, nearly level and gently sloping, and somewhat poorly drained. Occurs on flood plains along the tributaries of the Levisa Fork. This soil is low in natural fertility and organic matter content. These soils are mainly used for pasture and hay, or house sites and gardens. In some small areas it is used for cultivated crops.
UrC	*Uthorthents*	*0 to 15 percent*	**Yes**	**No**	Uthorthents consists of soils and rock material that has been drastically disturbed. Most areas of Uthorthents are along the Big Sandy Valley at Paintsville, Prestonsburg and other large communities. Texture is highly variable. Rock fragments make up about 5 to 75 percent of the total volume.
Source: NRCS 2000					

5.5.3.3 Prestonsburg Project Area

NRCS soil classifications within the Prestonsburg area are shown in **Figure 5-3**. The major soil limitation for site development in the floodwall alignment area is steep slopes. The right descending bank of Levisa Fork through the project area generally has a steepened lower slope that ranges from 20 feet in height in the upstream portion of the project to about ten feet near the downstream limits. Slopes of this lower slope vary from 1:1.6 to 1:1.9. These slopes appear only marginally stable and have a limited amount of vegetation. A natural bench or terrace that is between 20 and 60 feet wide is found at approximate elevation 610 feet AMSL throughout most of the project. This feature enhances the overall stability of the riverbank slopes and provides a limited buffer against global instability of the riverbank if erosion of the lower slope were to occur. An upper slope then extends from this lower terrace to the top of the riverbank. This slope is generally 20 to 25 feet high and has a slope of about 1:2. Isolated reaches of lower riverbank slope within the project limits exhibit flow geometries that are generally more conducive to erosion, such as short reaches on outside bends in the channel. In other areas, in situ soil shear strength properties are marginal, and erosion of the riverbank would be a concern because of the potential for slope instability concerns. Some reaches of the upper slope have also been identified as having higher potential for localized erosion of the upper slope due to high river velocities.

Test pits to evaluate soils in the three borrow areas were conducted to determine whether these areas had suitable soil material for the project. Three test pits were excavated in borrow area PB-2 and one test pit each in the Spurlock Creek and Granny Fitz borrow areas.

- PB-2 Test Pits 1-3 were taken between 0.5 feet and 2.0 feet below the ground surface (bgs), 0.5 feet and 2.8 feet bgs, and 0.5 feet and 4.0 feet bgs (respectively). PB-2 Test Pit 1 (TP-03-06) soil is described as moist, brown sandy lean clay comprised of coarse to fine sand with medium plasticity. PB-2 Test Pit 2 (TP-03-10) is described as moist, brown silty clay sand with gravel comprised of coarse gravel and course to fine sand of low plasticity. PB-2 Test Pit 3 (TP-03-11) is described as moist, brown sandy lean clay comprised of fine gravel and coarse to fine sand with medium plasticity.

- Granny Fitz Test Pit 1 (TP-03-13) was taken between 0.5 feet and 2.0 feet bgs Soil in Granny Fitz test pit is described as moist, brown sandy lean clay comprised of coarse to fine sand with low plasticity.

- The Spurlock Creek Test Pit 1 (TP-03-15) was taken between 0.5 feet and 3.0 feet bgs. Soil in Spurlock Creek test pit is described as moist, brown sandy silty clay comprised of coarse to fine sand with low plasticity.

5.6 Air Quality

5.6.1 Regulatory Framework

The USEPA is the primary agency responsible for regulating air emissions to protect air quality throughout the U.S. The primary regulatory authority for air quality in Kentucky is the Environmental and Public Protection Cabinet, Department for Environmental Protection, Division of Air Quality (DAQ).

Air quality control regions are designated by the USEPA pursuant to Section 107 of the CAA, as amended (CAAA). KY is under the jurisdiction of USEPA Region 4 and has ten air quality control regions. Floyd County is included in the Appalachian Intrastate Air Quality Control Region, which also includes Bell, Breathitt, Clay, Harlan, Jackson, Johnson, Knott, Knox, Laurel, Lee, Leslie, Letcher, Magoffin, Martin, Owsley, Perry, Pike, Rockcastle, Whitley, and Wolfe Counties (**Figure 5-4**).

The ambient air quality in a region can be characterized in terms of whether it complies with the primary and secondary national standards. The USEPA is required to set air quality standards for pollutants considered harmful to public health and welfare. Primary NAAQS set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, and prevention of damage to animals, crops, vegetation, and buildings (USEPA 1999a, b). These standards have been established for the following six principal pollutants, called criteria pollutants (as listed under Section 108 of the CAA):

- Carbon monoxide (CO);
- Lead (Pb);
- Nitrogen dioxide (NO_2);
- Ozone (O_3);
- Particulate matter, classified by size as follows:
- An aerodynamic size less than or equal to 10 micrometers (PM_{10});
- An aerodynamic size less than or equal to 2.5 micrometers ($PM_{2.5}$); and
- Sulfur dioxide (SO_2).

Criteria pollutants, when they exceed the NAAQS, can be detrimental to public health and the environment and can cause property damage. The NAAQS for each criteria pollutant are shown in **Table 5-2** (USEPA 1999b).

Table 5-2. National Ambient Air Quality Standards (NAAQS)

Pollutant	**Averaging Time**	**Standard**	
		Value	**Type**
National and State Standards			
Carbon monoxide (CO)	1 hour	35 ppm	Primary
	8 hours	9 ppm	Primary
Lead (Pb)	30 days	-	-
	1 quarter	1.5 $\mu g/m^3$	Primary & Secondary
Nitrogen dioxide (NO_2)	1 hour	-	-
	1 year	0.053 ppm	Primary & Secondary
Ozone (O_3)	1 hour	0.12 ppm	Primary & Secondary
	8 hours	0.08 ppm	Primary & Secondary
Particulate matter $\leq$ 10 µm diameter (PM_{10})*	24 hours	150 $\mu g/m^3$	Primary & Secondary
	1 year	50 $\mu g/m^3$	Primary & Secondary
Particulate matter $\leq$ 2.5 µm diameter ($PM_{2.5}$)*	24 hours	65 $\mu g/m^3$	Primary & Secondary
	1 year	15 $\mu g/m^3$	Primary & Secondary
Sulfur dioxide (SO_2)	3 hours	0.5 ppm	Secondary
	24 hours	0.14 ppm	Primary
	1 year	0.03 ppm	Primary

ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

N/A – Project Ambient Air Quality Standards (PAAQS) are not assigned a designation of primary or secondary.

Source: USEPA, 1999b

Kentucky fugitive emissions (401 KAR 63:010) regulates fugitive emissions of particulate matter under KRS 224.10-100. The regulations prohibit the discharge of visible fugitive dust emissions beyond the lot line (boundary) of the property on which the emissions originate. This regulation further prohibits any material to be handled, processed, transported, or stored without taking reasonable precaution to prevent particulate matter from becoming airborne. The regulation also requires reasonable precautions to be implemented including, but not be limited to, the following:

- Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land;

- Application and maintenance of asphalt, oil, water, or suitable chemicals on roads, materials stockpiles, and other surfaces which can create airborne dusts;
- Covering, at all times when in motion, open-bodied trucks transporting materials likely to become airborne; and
- The maintenance of paved roadways in a clean condition.

The City of Prestonsburg and Floyd County have no air quality ordinances.

5.6.1.1 Compliance with Federal/State Implementation Plans

Title III of the CAAA established a program for controlling emissions of Hazardous Air Pollutants (HAP). Under Title III, emission standards have been developed for sources that emit any of the chemical compounds listed in the Act. Initially, Title III affected major industrial sources of HAPs. A major source is any facility that emits 10 tons or more per year of any HAP or 25 tons of any combination of HAPs. These sources of emissions must be identified and are required to obtain an operating permit and comply with federally mandated control technology (i.e., Maximum Achievable Control Technology [MACT]) based on emission standards and other conditions. As no existing or proposed permitted facilities are part of the Proposed Action, this program does not apply.

5.6.1.2 General Conformity Rule

The General Conformity Provision of the CAA of 1970 (42 USC 7401 et. seq.; 40 CFR Parts 50-87) Section 176(c), including the USEPA's implementation mechanism, the General Conformity Rule (40 CFR Part 51, Subpart W), requires Federal agencies to prepare written Conformity Determinations for Federal actions in or affecting NAAQS non-attainment areas or maintenance areas.

Floyd County is designated in 401 KAR 51:010 as "In Attainment" for all NAAQS criteria pollutants; however, ambient air quality data is no longer collected within the county. A particulate sampler operated prior to 1999 within the county. The closest currently active monitoring site is located within Pike County. Pike County is considered to be "In Attainment" for all criteria pollutants with the exception of total suspended particulates, for which Pike County is designated in the "Cannot be Classified" category. Therefore, a written General Conformity Determination is not required for this Proposed Action.

5.6.2 Existing Conditions

Floyd County is designated in 401 KAR 51:010 as "In Attainment" for all NAAQS criteria pollutants.

The Kentucky DAQ has issued four draft Title V operating permits in Floyd County, all to energy production-related facilities. The first two facilities listed below were issued permits under the draft Air Quality General Permit for Natural Gas Transmission Stations and Processing Plants, G-97-001.

- Columbia Gas Transmission Company (Air Facility System (AFS)# 21-071-00151) G-99-001 -- Beaver Creek Station;
- Kentucky West Virginia Gas Company (AFS# 21-071-00138) G-99-001 -- Dwale Station;
- Equitable Resource Energy Company (AFS# 21-071-00140) V-03-026 ; and
- MarkWest Hydrocarbon, Inc (AFS# 21-071-00160) V-03-027.

All four facilities are located within the project area. Kentucky West Virginia Gas is located in Dwale near the city of Allen in Phase 2 of the project. The other three facilities are within Langley, a community along Right Fork Beaver Creek, in the Phase 3 project area.

5.6.3 Proximate Sensitive Receptors

With regard to air quality, sensitive receptors include, but are not limited to, asthmatics, children, and the elderly, as well as specific facilities, such as long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, playgrounds, and childcare centers. Sensitive receptors such as these exist within the project area.

5.7 Noise

5.7.1 Regulatory Framework

Federal and local governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise.

Noise is any sound that interferes with communications, is intense enough to damage hearing, or is otherwise annoying. Sound levels are usually measured and expressed in decibels (dB). The decibel scale is logarithmic and expresses the ratio of the sound pressure unit being measured to a standard reference level. Most sounds heard in the environment do not consist of a single frequency, but rather a broad band of frequencies differing in sound level. The intensities of each frequency component are additive and make up the overall broadband sound.

Environmental noise directly affects human health by causing hearing loss, generally if exposure levels are above 90 dB. Noise is suspected of causing or aggravating other health conditions. Environmental noise is also suspected of indirectly affecting human welfare by interfering with sleep, thought, conversation, and other normal activities. Noise can affect wildlife by disrupting feeding, breeding, and nesting activities.

A person’s ability to hear a sound depends greatly on the frequency composition of the sound. The method commonly used to quantify environmental sounds consists of adjusting the frequency components of a sound according to a weighting system which reflects the fact human hearing is less sensitive at low and extremely high frequencies, than at the mid-range frequencies. This adjustment is called “A” weighting, and the sound level measured is called the A-weighted sound level (dBA). "A" weighting most closely represents the response of the human ear to sound.

Noise levels decrease with distance from the noise source. For a point source, such as construction equipment, noise levels will decrease between 6 and 7.5 dBA for every doubling of the distance from that source. For a line source, such as traffic on a roadway, noise levels will decrease between 3 and 4.5 dBA for every doubling of the distance from the roadway.

Typical sound pressure levels for common noise sources are presented in **Table 5-3** to provide the reader with a frame of reference when considering the character and volume of noise levels:

Table 5-3. Sound Pressure Levels of Representative Noises

Source	Decibels	Comment
Large rocket engine (nearby)	180	
Jet takeoff (nearby)	150	
Pneumatic riveter	130	
Jet takeoff (200 feet)	120	Pain threshold
Construction noise (10 feet)	110	
Subway train	100	
Heavy truck (50 feet) and Niagara Falls	90	(Constant exposure endangers hearing)
Average factory	80	
Busy traffic	70	
Normal conversation (3 feet)	60	
Quiet office	50	Quiet
Library	40	
Soft whisper (16 feet)	30	Very quiet
Rustling leaves	20	
Normal breathing	10	Barely audible
Hearing threshold	0	

Source: Tipler 1976

One of the metrics used to quantify the noise environment is the Average Day-Night Sound Level (DNL). The DNL represents sound levels measured by totaling and averaging levels during a 24-hour period. A penalty of 10 dB is assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. The penalty value compensates for lower nighttime background noise levels and increased annoyance associated with events occurring at night. Although DNL does provide a single measure of overall noise impact, it does not provide specific information on the number of noise events or specific individual sound levels that occur. For example, a DNL of 65 dB could result from a small number of very loud events or from a large number of quieter events. Although it does not represent the sound level heard at any one particular time, it does represent total sound exposure. Scientific studies and social surveys have found DNL to be the best measure for assessing levels of annoyance associated with all types of environmental noise. Therefore, the scientific community and governmental agencies, such as USEPA, Federal Aviation Administration (FAA), the Federal Interagency Committee on Urban Noise (FICUN), and the Federal Interagency Committee on Noise (FICON), endorse its use.

Low-frequency sounds are heard as “rumbles,” and high-frequency sounds are heard as “screeches.” “Weighting” further refines sound measurement. The normal human ear can detect sounds that range in frequency from about 20 cycles per second (hertz or (Hz)) to 15,000 Hz. However, all sounds throughout this range are not heard equally well. Therefore, some sound meters are calibrated to emphasize frequencies in the 1,000- to 4,000-Hz range. The human ear is most sensitive to frequencies in this range, and sounds measured with these instruments are termed “A-weighted”. C-weighting has higher amplitude than A-weighting but at a lower frequency; further, C-weighting measures the low-frequency component of noise, which can cause buildings and windows to shake and rattle.

The DNL is a useful descriptor for noise because: (1) it averages continuous noise, such as a busy highway, and (2) it measures total sound energy over a 24-hour period. Thus, DNL effectively identifies a “noise dose” for a day.

Federal agencies generally agree that a DNL below 65 dBA (Zone I) is compatible with residences, nursing homes, schools, and similar land use types. A DNL above 75 dBA (Zone III) is generally considered unacceptable for these land uses. For sound levels within a DNL of 65 and 75 dBA (Zone II), noise attenuation measures are recommended in the design and construction of public and quasi-public service buildings.

The other metric used in defining noise zone is peak sound level (decibels peak (dBP)), which is the maximum instantaneous sound level of an event. The dBP is neither weighted or time integrated.

Under NEPA, the Noise Control Act of 1972 (PL 92-574), and EO 12088, the USACE is required to assess the environmental impact of noise produced by its activities. Within such an assessment, strategies are promulgated to protect both on- and off-site receptors from environmental noise.

The Noise Control Act of 1972 and several other laws require the federal government to set and enforce uniform noise control standards for aircraft and airports, interstate motor carriers and railroads, workplace activities, medium and heavy-duty trucks, motorcycles and mopeds, portable air compressors, and federally assisted housing projects located in noise exposed areas. The Noise Control Act also requires federal agencies to comply with all federal, state, and local noise control laws and regulations.

Most Federal noise standards focus on preventing hearing loss by limiting the public's exposure to noise levels that approach 90 dBA and higher. However, some are more stringent and prohibit lower sound levels that are annoying and can diminish one's quality of life. The standards for each source of noise and the federal agencies responsible for setting and enforcing them are varied. State and local governments determine the extent to which all other sources of noise are controlled, and regulations for such sources can vary widely among localities.

Floyd County and Prestonsburg have no noise ordinances.

5.7.2 Existing Conditions

Noise sources in the project area are variable, and are a combination of natural and man-made sounds. Sources of environmental noise may include, but are not limited to: traffic from major roadways and bridges; businesses and industries; trains; athletic events (especially at the Prestonsburg High School); construction events, such as home-building or repair; roadway repair; and wind, animals (such as barking dogs) and other natural noises. Sensitive noise receptors are considered to be residences, hospitals, churches, schools, parks, and other locations where excessive noise exposure could adversely impact daily activities, health, or welfare. Sensitive receptors such as these are found in the project area.

Limited noise monitoring was conducted in May 2004 to assess the existing environmental noise levels at locations representative of sensitive receivers within the project vicinity likely to experience impacts (AMEC 2004). The monitoring locations are shown in **Figure 5-5**. Background noise in the project vicinity includes the steady sound of wind and nearby random, man-made transient noise sources. Transient noise includes local vehicular traffic, wind gusts, airplanes, animals, trains, and other human-caused disturbances.

Existing noise is made up of background sound levels including transient noise, in the areas surrounding the proposed project. Measured noise levels ranged from a low of 39.9 to a high of 92.1 dBA during the day (7 a.m. to 6 p.m.), when construction activities are expected to occur. Differences in existing noise levels depended mainly on the proximity of transient noise sources to the location monitored. The peak transient noise levels are 8.4 to 23.6 dBA above the equivalent noise level, or L_{eq}. Average night-time ambient noise levels are anticipated to be about 10 dBA L_{eq} lower than day-time levels.

Background noise levels are relatively low. Predominant transient sources include local vehicular and/or railroad traffic. The railroad tracks are located across the Levisa Fork to the west/southwest, approximately 500 to 800 feet from each of the receiver locations. As shown in **Table 5-4**, monitored receivers' existing noise levels were below 65 dBA L_{eq} except Receiver #1 and #5, which had a noise level of 70.4 dBA L_{eq} and 68.5 dBA

L_{eq}. Receiver #1 was approximately 15 to 20 feet away from college landscapers and Receiver #5 was 30 feet from a backhoe creating a boat ramp for the park facility.

Table 5-4. Noise Monitoring Locations and Results

Location Number	Type and No. of Receivers Represented	Description	Measured Ambient Noise Levels [dBA]		
			L_{eq}	L_{min}	L_{max}
1	Institutional (1), Recreational	Big Sandy Community & Technical College (Between buildings facing East parking lot)	70.4	49.3	80.8
2	Institutional (1), Recreational	Big Sandy Community & Technical College (Deck facing North parking lot)	55.4	47.1	75.2
3	Church (1) Recreational	Memorial Park located behind Community United Methodist Church	54.3	39.9	75.2
4	Institutional (1), Recreational	Prestonsburg H.S. (Behind main athletic field bleachers)	46.0	41.8	65.1
5	Recreational	River Park (parking lot facing river)	68.5	49.3	92.1

Source: AMEC, 2004

5.8 Water Resources

5.8.1 Regulatory Framework

Protection and management of water resources is mandated by a number of laws, regulations, and guidances. Within the United States, "waters of the U.S." are regulated under Sections 401 (33 USC 1341) and 404 (33 USC 1344) of the Federal CWA. Primary Federal regulations and guidance that govern water resources development, usage, and discharges at federal sites, or sites affected by federal activities, include the following:

- Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA; 42 USC 11011)
- Federal Water Pollution Control Act of 1972 (FWPCA), as amended by the Clean Water Act of 1977 (CWA; 33 USC §1251 *et seq*.) [12]
- Land and Water Conservation Act of 1976 (16 USC 460)

[12] The FWPCA, as amended by the CWA, regulates the potential for degradation and actual degradation of United States waters, with the objective of maintaining and restoring their chemical, physical, and biological integrity; Guidelines regarding the control or discharge of dredged or fill material in United States waters, including wetlands, are contained in Sections 401 and 404 of the CWA, as well as 33 USC §1344(b) and §1361(a). The CWA was amended by the Clean Water Quality Act of 1987 to improve water quality in areas where compliance with nationwide minimum discharge standards was insufficient to assure attainment of water quality goals.

- NEPA of 1969 (42 USC 4321 *et seq.*) [13]
- National Pollutant Discharge Elimination System Wastewater Permits (NPDES; 33 USC 1342)
- Pollution Prevention Act of 1990 (PPA; 42 USC 13101-13109)
- Safe Drinking Water Act of 1974 (SDWA; 42 USC 300f *et seq*.)
- Soil and Water Resources Conservation Act of 1977 (16 USC 2001)
- Superfund Amendments and Reauthorization Act of 1986 (SARA; PL 99-499; 40 CFR 300)
- EPCRA of 1986 (42 USC 11011)
- Water quality programs in general (33 USC §1160 *et seq*. and §1251 *et seq*.), (42 USC 300f *et seq*. and 6901 *et seq*.)
- WRDA of 1990 (33 USC 2309a, 2316, and 2320)
- Wild and Scenic Rivers Act of 1968 (WSRA; 16 USC 1271 *et seq*.)
- 32 CFR Part 651, Environmental Effects of Army Actions
- EO 11988, Floodplain Management, 24 May 1977
- EO 11990, Protection of Wetlands, 24 May 1977
- EO 11991, Protection and Enhancement of Environmental Quality, 24 May 1977
- EO 12856, Federal Facilities Compliance with the Toxics Release Inventory (TRI) Requirements of Title III, Section 313 of SARA, 3 August 1993.

The KDOW regulates and monitors water quality throughout Kentucky by delegation from the USEPA, Region 4. Typical water contaminant sources in Floyd County include mineral extraction and acid mine drainage, municipal point sources (e.g. package wastewater treatment plants), uncontrolled dumping, litter, septic tanks, and straight pipes (raw sewage) (BSADD, 2003). Previous channelization and riparian zone clearing have also impacted Levisa Fork water quality.

The KDOW is required to classify waters of the Commonwealth in 401 KAR 5:026 for all legitimate uses listed in the KRS 224.020(1). These classifications include the following:

- Warm Water Aquatic Habitat (WAH): surface waters and associated substrate that will support indigenous warm water aquatic life;
- Cold Water Aquatic Habitat (CAH): surface waters and associated substrate that will support indigenous aquatic life or self-sustaining or reproducing trout populations on a year-round basis;

[13] Section 102(2)(H) of NEPA requires that conducted analyses will consider "ecological information" in planning and development. This requirement and ARs 200-1 and 200-3 require that analyses conducted pursuant to NEPA investigate potential effects to terrestrial, avian, and aquatic species and habitats. As such, water resources are included in this description.

- Primary Contact Recreation (PCR): waters suitable for full body contact during the recreational season of May 1st through October 31st;
- Secondary Contact Recreation (SCR): waters suitable for partial body contact recreational, with minimal threat to public health due to water quality;
- Domestic Water Supply (DWS): surface waters that with conventional treatment are suitable for human consumption through a public water system, culinary purposes, or for use in any food or beverage processing industry and meet SDWA requirements; and
- Outstanding Resource Water (ORW).

Waters of the Commonwealth not specifically classified are designated for the use of WAH, PCR, SCR, and DWS.

The CWA Section 303(d) requires states to identify waters that do not meet applicable water quality standards after the application of technology based controls. As defined in the CWA and federal regulations, water quality standards include the designated uses of a water body, the adopted water quality criteria and an antidegradation policy. As defined in KY regulations, water quality standards are beneficial uses to be made of a waterbody and the established water quality objectives. The section 303(d) list must include a description of the pollutants causing the violation of the water quality standards (40 CFR 130.7(b)(iii)(4) and a priority ranking of the water quality limited segments, taking into account the severity of the pollution and the uses to be made of the waters (KDOW, 2005).

Floodplains are generally areas of low, level ground, present on one or both sides of a stream channel, which are subject to either periodic or infrequent inundation by floodwaters. Floodplains are most likely the result of the natural processes of lateral erosion and deposition that occur as a river valley widens. The porous material that composes the floodplain is conducive to retaining water that enters the soil via flooding events and elevated groundwater tables. Periodic inundation dangers associated with floodplains have prompted Federal, state, and local legislation to limit development in these areas to recreation, agriculture, and preservation activities. FEMA regulates floodplains with standards outlined in 44 CFR Part 60.3.

5.8.2 Surface Water and Floodplains

5.8.2.1 Levisa Fork Basin

The Levisa Fork originates in Buchanan County, Virginia and flows to Millard, KY where it is joined by its largest tributary, Russell Fork, and continues in a northwesterly direction to Prestonsburg, KY. From Prestonsburg it flows nearly due north to its junction with Tug Fork at Louisa, KY. The confluence of the Tug and Levisa Forks forms the Big Sandy River. The total length of the Levisa Fork is approximately 164 miles, of which 34 miles are in VA and the balance in Pike, Floyd, and Johnson Counties, KY. The Levisa Fork drains a total of 2,326 square miles. The upper Levisa Fork drains portions of Pike County and Buchanan County, Virginia, while the lower Levisa Fork drains portions of Pike, Knott, Floyd, Johnson, Magoffin, Morgan, and Lawrence counties in KY (USACE, 1998). Stream discharge rates at the mouth of the Levisa Fork range between a low flow of approximately 200 cubic feet per second (cfs) and the recorded maximum of 80,000 cfs[14], with a normal flow of 2,500 cfs. (USGS, 2006)

5.8.2.2 Floyd County

The most significant tributaries of the lower Levisa Fork within Floyd County include Middle Creek, Beaver Creek, and Mud Creek. These tributaries discharge into the Levisa Fork at Prestonsburg, Allen, and Harold, respectively. Additional smaller tributaries that fall within the study areas include Abbott Creek, Brandykeg Creek, Bull Creek, Cow Creek, Johns Creek, Ivy Creek, Mare Creek, Little Paint Creek, Little Mud Creek, Praeter Creek, and Toler Creek. Tributary streams in Floyd County are generally short and steep resulting in a likelihood of flash flooding during heavy runoff periods, particularly in spring and early summer. Winter flooding can also occur, generally resulting from less intense but extended precipitation events when the ground is saturated, frozen, or snow-covered (BSADD, 2003).

The lower Levisa Fork within Floyd County has been classified as identified in **Table 5-5** below:

Table 5-5. Lower Levisa Fork River Class and Land Use

Resource	Kentucky River Class
Agricultural lands	3
Urban corridor character (RM 116.2 to 124.6)	3
Fish resources	3
Recreational flatwater boating	2
Future development of water resources	2
Cultural Resources	1
Source: KY Rivers Assessment, 1992	

A Class 3 designation for agricultural lands means that the river is associated with farmable land, prime farmland, or prime timberland. Urban corridor character measures the river's physical characteristics, existing and potential access, and shoreline character in order to assess its value to adjacent communities. A Class 3 designation for urban corridor character generally indicates the river has limited river access, lower physical water character, and limited potential for shoreline quality improvement. A Class 3 designation for fish resources implies that the river has viable, active fisheries, but is not considered outstanding, unique, or unusual with respect to its fish populations.

[14] The historic peak flow of 82,900 cfs was recorded in February 1862 at Pikeville, Kentucky.

The Class 2 designation for flatwater boating indicates medium navigability, depth, water and scenic quality, and access. The Class 2 designation for future development of water resources is based on the potential for future development as a water supply, occurrence of developed or undeveloped hydroelectric sites, and commercially navigable waterways. In addition, the lower Levisa Fork is characterized as a Class 1 for cultural resources, which indicates the river has historic or prehistoric archaeological sites or historic architecture reflecting river-related life (KY Rivers Assessment, 1992).

Lower Levisa Fork tributaries also meet various KY River classifications. Johns Creek is Class 3 for agricultural land from Pike County to Dewey Lake in Floyd County and for fish resources from Pike County to where it meets the Levisa Fork. Mud Creek and Little Mud Creek are Class 3 for agricultural lands. Both the Left and Right Fork of Beaver Creek and Middle Creek are Class 3 for fish resources. No rivers meet classification standards for either water quality or botanical resources within Floyd County (KY Rivers Assessment, 1992).

Dewey Lake Reservoir in Floyd County lies within Johns Creek, an eastern tributary of the Levisa Fork near the northern border of Floyd County. The reservoir was completed and placed in operation in 1949 for the primary purpose of flood control, but also provides recreational resources and fish and wildlife enhancement to the area. The reservoir is the main feature of Jenny Wiley State Park. The reservoir has enough storage capacity to withstand runoff from precipitation events of 6.9 and 7.3 inches during summer and winter months, respectively (BSADD 2003).

Phase 1 Nonstructural Area. The majority of this phase is located within the floodplains of the Levisa Fork. Structural alternatives are being considered along the Levisa Fork within the City of Prestonsburg. Additional tributaries of the Levisa Fork located within phase one include Little Paint Creek, Johns Creek, Bull Creek, Brandykeg Creek, and the downstream portion of Abbott Creek and Middle Creek. The outlet of Abbott Creek and Middle Creek are located within the vicinity of the proposed floodwalls. A stream with a riparian corridor exists in each of the Spurlock Creek and Granny Fitz borrow areas.

Phase 2 Nonstructural Area. The majority of this phase is located within the floodplains of the Levisa Fork. Mud Creek, Little Mud Creek, Toler Creek, and a small portion of Beaver Creek are located within this phase. Smaller streams within the project area include Cow Creek, Praeter Creek, Ivy Creek, and Mare Creek.

Phase 3 Nonstructural Area. The majority of this project area is located within the floodplains of Beaver Creek and both its Right and Left Forks. Additional Levisa Fork tributaries within phase three include Abbott Creek and both the Right and Left Fork Middle Creek. Small tributaries of Beaver Creek (include Clear Creek, Otter Creek, and Arkansas Creek) and Middle Creek (include Spurlock Creek) are located in this area.

5.8.2.3 Levisa Fork within Prestonsburg Structural Area

The Levisa Fork within the Prestonsburg area was evaluated for the presence of special aquatic sites. Special aquatic sites are defined as geographic areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. These areas are generally recognized as significantly influencing or positively contributing to the general overall environmental health or vitality of the entire ecosystem of a region (40 CFR 230.3(q-1). Types of special aquatic sites, as identified in 40 CFR 230.40-45, include sanctuaries and refuges, wetlands, mud flats, vegetated shallows, coral reefs, and riffle and pool complexes.

Several streambed features, special aquatic sites, were identified in the Levisa Fork along the proposed floodwall alignments. These features are not always visible because of the Levisa Fork's changing water levels. They are generally visible only during low water conditions. The features noted during site reconnaissance include:

- Site A: A potential riffle area just upstream of the floodwall, at approximate RM 54.15.
- Site B: A vegetated shallow along the left bank at approximate RM 53.82. The bar surfaces are submerged except during low water conditions.
- Site C: A vegetated shallow along the right bank at approximate RM 53.45. The bar surfaces are submerged except during low water conditions.
- Site D: A vegetated shallow along the left bank at approximately RM 52.2. The bar surfaces are submerged except during low water conditions.

5.8.2.4 Levisa Fork Tributaries within Prestonsburg Structural Area

Three small tributaries of the Levisa Fork are located within the floodwall alignment area, which include Trimble Branch, May Branch, and an unnamed tributary on the BSCTC campus (hereafter referred as Campus Branch) (see **Figure 5-6**). All three streams have been heavily modified over time. Each has been culverted, rerouted, passed under roadways, combined with storm sewers, and neglected during its path through Prestonsburg. The streams originate in the hills east of Prestonsburg and pass through the city en route to the Levisa Fork.

Trimble Branch. Trimble Branch is located north of and adjacent to the First Commonwealth Bank in downtown Prestonsburg. Within the project area, this stream emanates from a large culvert and runs approximately 300 feet to its confluence with the Levisa Fork. This stream suffers from backwater conditions associated with the rise of the Levisa. Deep sedimentation is evident and the first 15 feet of the banks are bare. The heavily vegetated steep upper banks are very unstable. Canopy cover is approximately 50 percent during the growing season.

May Branch. May Branch is located north of and adjacent to the Prestonsburg High School. Within the project area, the upper reach of the stream emanates from a box culvert that is under a parking lot and road. The upper reach of May Branch is approximately 360 feet in length. The stream appears to have been channelized in the past but regained some natural dimension, pattern and profile. Frequent backwater conditions are likely based on the stream's appearance, but the lack of significant sediment in this upper portion of the stream indicates an ability to move particles through the system. There is neither canopy cover nor in-stream cover for this reach. While no physical barrier separates them, the upper reach of May Branch is significantly different from the lower portion. The lower reach of May Branch is approximately 374 feet in length. Due to the excessive water levels when the Levisa Fork rises, backwater conditions occur that result in sedimentation and high erosion. The banks along this reach are bare, contributing additional sediment. This portion of May Branch has a nearly 100 percent canopy cover during the growing season from the large deciduous trees along the top of the bank.

Campus Branch. The Campus Branch is divided into three sections of significantly different characteristics. This tributary runs along the eastern side of the BSCTC campus. Within the project area, the upper section of the Campus Branch consists of a cement trapezoidal channel conveying drainage from a storm drain southeast of the college to a culvert under the entrance road. The Campus Stream emanates from this culvert. The middle reach of the Campus Stream emanates from the aforementioned culvert under the entrance road to the community college and runs from the culvert approximately 560 feet. The stream is relatively unstable, with erosion from high banks. This reach of stream has almost total canopy cover during the growing season from large deciduous trees located along the stream banks. Grounds keepers maintain the grass to the water's edge. The lower reach of this Campus Stream flows for approximately 461 feet until its confluence with the Levisa Fork. The banks are highly unstable. There is an abundance of sediment more than a foot deep in places, most likely a result of evident backwater conditions. The stream bed also contains large amounts of rubble such as large cement slabs, discarded pipes, trees and pruned limbs, yard waste and man made materials. During the growing season shrubs and deciduous trees provide almost complete canopy cover. Towards its confluence with the Levisa Fork there is a drop in slope of about 32 feet.

5.8.2.5 Soil Borrow Areas

Four seeps in the bedrock were observed in borrow area PB-2. Seeps were located on very steep mountain slopes, which then ran along the base of the mountain. Minimal flow was observed in all seeps. A stream with a riparian corridor exists in both the Spurlock Creek and Granny Fitz borrow areas. The Spurlock Creek Branch was evaluated as "marginal" using the Kentucky Habitat Assessment, while the Granny Fitz Branch was evaluated as "suboptimal".

5.8.3 Surface Water Quality

The segments of Levisa Fork located in Pike and Lawrence Counties are designated WAH, PCR, SCR, and DWS. None of the surface waters located in Floyd and Johnson counties except for Dewey Reservoir are specifically classified in KAR 5:026. Dewey Reservoir is designated as WAH, PCR, SCR, and DWS.

In 2004, the KDOW listed the Levisa Fork within Floyd and Johnson counties (RM 65.0 to 97.3) as not supporting swimming because of pathogens. Beaver Creek within Floyd County was listed (RM 0.0 to 7.0) as not supporting aquatic life or swimming due to pathogens and siltation. In addition, Abbott Creek (RM 0.0 to 2.3) is considered an impaired stream segment for swimming as a result of pathogens based on Discharge Monitoring Reports gathered from Municipal Point Sources. Left Middle Fork (RM 0.0 to 8.4) is listed as not supporting aquatic life. River segments listed above all fall within one of the three project phases. Abbott Creek and the Levisa Fork segments are the only river segments listed above that are within the vicinity of the proposed floodwall in Prestonsburg. Suspected sources of pollutants were identified as resource extraction, land disposal, municipal point sources, septic tanks, and straight pipes.

Based on 2000 KDOW stream assessments, the University of Kentucky's PRIDE Water Quality Assessment Report developed ranked scores for potential environmental impacts for 40 counties in KY. Floyd County streams were ranked third most severely impacted (PRIDE Report I). Potential impacts were based on total impacted stream miles, the number of straight pipes and failing septic systems, capacity of package plants, number of illegal dumps, effluent capacity of wastewater treatment facilities, and the number of mines. In 2002, KDOW estimated 19.2 miles of impaired streams existed in Floyd County.

Fecal coliform bacteria pollution was identified as severely impacting the streams of five counties within the PRIDE Report. Two of the five counties, Floyd County and Johnson County, are located within the Big Sandy River Basin. Title 401 KAR 5:031 identifies applicable surface water standards, including fecal coliform, for waters of the Commonwealth. A summary table of these limits according to the designated use has been prepared in **Table 5-6**.

Table 5-6. Surface Water Standards for waters of the Commonwealth

Designation	Limit	Time of Year
DWS	2000 colonies/100 milliliters (ml) (geometric mean)	All
PCR	200 colonies/100 ml in at least 5 samples per month; nor 400 colonies/100 ml in at least 20 percent sample per month	May 1 – Oct 31
SCR	1000 colonies/100 ml in at least 5 samples per month; nor 2000 colonies/100 ml in at least 20 percent sample per month	Nov 1 – Apr 30
Source: 401 KAR 5:031		

Floyd County fecal coliform results indicated by PRIDE Report II have increased since 1993. Water samples collected in 1993 detected a median level of 26 colonies/100ml in Floyd County (minimum=1 colonies/100ml; maximum = 600; n = 26), whereas in 1999 the median level of fecal coliform was 6,000 colonies/100ml (minimum=10 colonies/100ml; maximum = 20,000; n = 10).

Elevated ammonia levels within three PRIDE Report counties were found including Johnson County and Floyd County within the Big Sandy River Basin (PRIDE Report IV). Floyd County levels were estimated to be on average 1.00 milligrams per liter (mg/L) (n=10). Ammonia levels exceeding 0.05mg/L are typically considered to not support aquatic life (the instream limit included in 5:031 Section 4(g)).

5.8.4 Wetlands

As defined in 33 CFR Part 328.3 (b), the term **wetlands** describes those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include: swamps, marshes, bogs, sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds.

Both Federal and State laws and regulations protect waters of the state, which includes wetlands. The Clean Water Act is the primary law protecting US waters. Section 404 of the CWA (33 USC 1344) prevents the discharge of dredged or fill material into waters of the US without a permit from the USACE. Generally, whenever a Section 404 permit is required, a Section 401 WQC issued by the Commonwealth of Kentucky is also required. The Division of Water's – Water Quality Branch is responsible for implementing Section 401. For wetlands impacts greater than an acre in size, the KY "Wetland Mitigation Guidelines" should be followed when applying for the WQC.

EO 11990 (24 May 1977) provides guidance on wetlands management. The intent of this EO is that Federal agencies implement these requirements through existing procedures, such as those established to implement NEPA. This EO requires each Federal agency to provide leadership and take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out that agency's responsibilities for:

- Acquiring, managing, and disposing of Federal lands and facilities
- Providing federally undertaken, financed, or assisted construction and improvements
- Conducting Federal activities and programs that affect land use, including (but not limited to) water and related land resource planning, regulating, and licensing activities. 32 CFR Part 651 provides guidance for wetlands management as a sub analysis of the NEPA process.

Floyd County has relatively few wetlands because of its topography. National Wetlands Inventory (NWI) maps for Floyd County obtained from the USFWS indicate approximately 1,975 acres of potential wetlands, representing less than one percent of the land area. Although six percent of the county has hydric soils (see Section 5.5.3.2), the acreage of wetland is most likely less due to development within the floodplain.

Wetlands within the borrow areas and vicinity of the proposed structural alternatives were assessed using site reconnaissance, topographic maps, and aerial photos. Potential wetlands identified within and adjacent to the construction work limits of Alternative Plan 2 include one palustrine emergent wetland, which comprises about 0.4 acres (Figure 5-6). The wetland is in an area planned to be used to collect interior drainage during flood events. No wetlands were identified within the proposed borrow areas.

5.8.5 Groundwater

The area is characterized by relatively flat-lying layers of alternating sequences of Pennsylvanian Breathitt Group sedimentary rocks and alluvial deposits along major streams. Groundwater occurs in alluvium deposited in the flood plain of the Levisa Fork, and from Breathitt Group rocks, principally sandstone with lesser amounts of groundwater occurring in shale and coal.

Floyd County lies within the consolidated-rock aquifer known as the Pennsylvanian aquifer, which comprises a portion of the larger scale Appalachian Plateau Aquifer. Groundwater within consolidated-rock aquifers is found primarily in the fractures of sandstone and shale as bedding materials tend to have little or no permeability. Permeability and well yields are dependent on the number of fractures and their level of connectivity. According to the USGS, Floyd County overall draws 1 to 10 million gallons per day (mgd) of fresh groundwater (USGS 1995).

Nearly 75 percent of wells drilled in valley bottoms and along hillsides provide adequate yield for domestic supply. A lesser number of ridgetop or hilltop wells provide an adequate water supply. Well yields in the alluvium in the lower Levisa Fork sections can reach 20 or 25 gpm, with most wells yielding more than 100 gpm. (KGS, 2001). Replenishment of groundwater (recharge) is reduced by the loss of forest cover and by mineral extraction causing more surface water runoff and less opportunity for surface water seepage into the ground.

Most groundwater from wells is moderately hard and contains noticeable iron. Salt can be an issue in the northwestern two-thirds of the county for wells less than 100 feet deep in valley bottoms (Water Resources Development Commission (WRDC) 2003). Naturally occurring groundwater contaminants include sulfate, sodium chloride, iron and manganese. Mineral extraction can lead to increases in sulfate and metals concentrations in groundwater (KGS, 2001).

The northeastern part of the County (i.e. east of the Levisa Fork) yields 500 to 1,000 gpm, while the western half yields a maximum of 50 gpm. Available groundwater quantities can vary significantly throughout the seasons. As precipitation decreases, supplies diminish quickly due to rapid drainage and shallow soils in the area (Kentucky Water Resources Research Institute 2001).

5.9 Ecological Resources

5.9.1 Regulatory Framework

Several laws, regulations, and guidances mandate protection and management of biological resources. The primary statutes, regulations, EOs, and guidance that direct and apply to management of biological resources include the following:

- ESA of 1973 (16 USC 1531 *et seq*.) [15]
- Eagle Act of 1958 (10 USC 2671)
- Federal Insecticide, Fungicide, and Rodenticide Act of 1947 (7 USC 136)
- Federal Noxious Weed Act of 1975 (7 USC 2801)
- FWPCA of 1972, as amended by the CWA of 1977 (33 USC 1251 *et seq*.) [16]
- Fish and Wildlife Conservation Act of 1980 (16 USC 2901 *et seq*.)
- Fish and Wildlife Coordination Act of 1934 (16 USC 661 *et seq*.)
- Migratory Bird Conservation Act of 1966 (16 USC 715)
- Migratory Bird Treaty Act of 1918 (16 USC 703-711)
- NEPA of 1969 (42 USC 4321 *et seq*.) [17]
- EO 11987, Exotic Organisms, 24 May 1977
- EO 11988, Floodplain Management, 24 May 1977
- EO 11990, Protection of Wetlands, 24 May 1977 [18]

---

[15] The protection of federally listed species is regulated under ESA. Section 7 of the ESA dictates that Federal actions should not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of such species. AR 200-3 provides direction for the implementation of the ESA on Army (or ARNG) installations per EO 11990. In addition, NEPA review and consideration of state-listed species is required per Section 5-3(q) of 32 CFR PART 651. Furthermore, Section 7(a) of the ESA requires formal consultation with the USFWS whenever a Federal proponent anticipates taking any action that may affect a listed species or critical habitat.

[16] The FWPCA regulates the potential for degradation and actual degradation of United States waters, with the objective of maintaining and restoring their chemical, physical, and biological integrity (USACE 1987 wetland delineation manual). The CWA may be applied specifically to deposition of dredged or fill material into "…waters of the United States, including wetlands." Activities in wetlands for which permits may be required, if no avoidance alternatives are feasible, include, but are not limited to: 1) placement of fill material; 2) ditching activities when material is sidecast; 3) levee and dike construction; 4) land clearing involving relocation of wetland soil material or removal of hydrophytic vegetation; 5) land leveling; 6) most road construction; and 7) dam construction.

[17] Section 102(2)(H) of NEPA requires that analyses will consider "ecological information" in planning and development of Federal actions. This requirement and ARs 200-1 and 200-3 require that analyses conducted pursuant to NEPA investigate potential effects to terrestrial, avian, and aquatic species and habitats.

[18] EO 11990 provides guidance on protection of wetlands. This EO requires all Federal agencies to issue or amend existing procedures to ensure consideration of wetland protection in decision-making. It is the intent of this EO and EO 11988 (Floodplain Management) that Federal agencies implement these requirements through existing procedures, such as those established to

- EO 11991, Protection and Enhancement of Environmental Quality, 24 May 1977.

5.9.2 Aquatic Resources

Floyd County. In Floyd County, 100 aquatic species have been observed, including 74 species of fish, three species of lamprey, 22 species of freshwater mussels, and one clam specie (KDFWR, 2003). The full diversity of habitats may not be observed within the entire county. Various streams have poor quality due to siltation and pathogen pollution. These streams would be expected to have a low diversity of aquatic species. The KDOW examined benthic macroinvertebrate surveys collected within Floyd County. Levisa Fork was determined to be in full support of aquatic life within Floyd County. Left Middle Fork (RM 0.0 to 8.4) was considered not in support of aquatic life. Left Fork Beaver Creek (RM 0.0 to 11.4 and 13.6 to 18.7) and Right Fork Beaver Creek (0.0 to 17.4) were listed as in partial support of aquatic life. These streams would be expected to have a low diversity of aquatic species.

The USGS Prestonsburg quadrangle was used to narrow down potential aquatic species that may reside within phase one project boundaries as structural measures (e.g., floodwall) are proposed within this region of Floyd County. Within the Phase I project area, approximately 38 aquatic species are expected to occur including 35 fish, two freshwater mussels, and one clam (KDFWR, 2003).

Aquatic organisms observed within Floyd County are listed in **ANNEX B.**

5.9.3 Terrestrial Resources

5.9.3.1 <u>Vegetation</u>

Floyd County. Floyd County is located within the Central Appalachian - Dissected Appalachian Plateau Ecoregion, which is composed of narrow ridges, deep coves, and narrow valleys. The majority of Floyd County is forested.

Mixed mesophytic forest is the normal climax vegetation type in this region; however, forest communities may vary in species composition based on topography, elevation, slope, aspect, soils, and other variables. Common tree species of mixed mesophytic forests include oaks (*Quercus* spp.), hickories (*Carya* spp.), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), tuliptree (*Liriodendron tulipifera*), beech (*Fagus americana*), black cherry (*Prunus serotina*), black walnut (*Juglans nigra*), Eastern hemlock (*Tsuga canadensis*), shagbark hickory (*Caraya Ovata*) and many others.

Riparian forests are located adjacent to rivers. In the region, riparian forests are often composed of the following species: box elder (*Acer negundo*), silver maple (*Acer saccharinum*), yellow buckeye (*Aesculus octandra*), river birch (*Betula nigra*), American beech (*Fagus grandifolia*), green ash (*Fraxinus pennsylvanica*), sycamore (*Platanus occidentalis*), black willow (*Salix nigra*), and slippery elm (*Ulmus rubra*). Shrubs and

implement NEPA. 32 CFR PART 651 provides guidance for protection of wetlands on ARNG properties as a subcomponent of the NEPA process.

vines of riparian forest habitats include brookside alder (*Alnus serrulata*), crossvine (*Bignonia capreolata*), elderberry (*Sambucus canadensis*), wild hydrangea (*Hydrangea arborescens*), privet (*Ligustum vulgare*), spicebush (*Lindera benzoin*), pawpaw (*Asimina triloba*), ironwood (*Carpinus caroliniana*), and poison ivy (*Toxicodendron radicans*). Common herbaceous species include giant ragweed (*Ambrosia trifida*), orange jewelweed (*Impatiens capensis*), yellow jewelweed (*Impatiens pallida*), water willow (*Justicia americana*), common horsetail (*Equisetum arvense*), and Virginia saxifrage (*Saxifraga virginensis*).

Old field and scrub/shrub uplands primarily include previously disturbed or cleared land that has been allowed to revegetate and is in various stages of early succession. Old field is used to describe open, non-forested land dominated by a variety of early successional species, including broomstraw (*Andropogon virginicus*) and other grasses and various forbs. Old field areas may also have scattered shrubs.

Prestonsburg Area. Land cover within the proposed construction limits (includes floodwall alignment and borrow areas) include: riparian forest; upland mixed forest; disturbed land, emergent wetlands, maintained areas (including commercial and residential, lawn, institutional and urban/industrial, and landscaped areas).

Vegetation communities in the Prestonsburg structural study area were assessed using site reconnaissance, aerial photography, and existing topographic maps. Refer to **Figures 5-7A** through **5-7H**.

Based on site reconnaissance, the riparian forests are generally low to medium quality and are dominated by a combination of only a few species including box elder, silver maple, tuliptree, and sycamore. Riparian areas adjacent to the river (within approximately 100 ft) generally had little understory, except in disturbed areas where dense seedlings occur. Riparian areas further from the river seem to have a greater diversity of trees, shrubs, and herbaceous vegetation. There are no high quality or old growth bottomland forest communities within the proposed construction limits. The riparian forests within the project areas likely provide good habitat for some species (i.e., various birds), but provide very little habitat for other species (i.e., gray squirrel (*Sciuris carolinenesis)*). There were no hard mast-producing species observed in riparian forests in the project area.

Upland mixed forests within the project area typically contain a mixture of hardwoods (i.e., oaks, hickories) and pines (i.e., shortleaf pine (*Pinus echinata)*, Eastern white pine (*Pinus strobus*)). Areas within the construction corridor are adjacent to developed areas and are not extensive in nature.

Disturbed land within the Prestonsburg study area typically contains a significant amount of semi-woody vegetation, shrubs (i.e., blackberry), and seedlings. These areas may provide some habitat for species that require nonforested habitat; however, due to the disturbed nature of these areas, they are considered relatively low quality.

5.9.3.2 Wildlife

Floyd County is primarily forested and has a diverse wildlife population. Approximately 148 species of terrestrial wildlife have been recorded in Floyd County including 23 mammals, 101 birds, seven reptiles, and 17 amphibians (KDFWR 2003). The proposed project area does not include the full diversity of habitats that Floyd County and the wider Levisa Fork drainage area encompasses. Terrestrial wildlife species expected to be present within the three project phases would be those species typically found in riparian forests, open fields, or disturbed areas. The USGS Prestonsburg quadrangle was used to narrow down the potential species that may occur in the area of the proposed floodwall in the Phase I area.

5.9.4 Special Status Species

The Endangered Species Act of 1973 (16 USC §1531 et seq.) is the primary law by which rare species are protected in the United States. Under the ESA, species may be listed as threatened or endangered. Endangered means a species is in danger of extinction throughout all or a significant portion of its range. Threatened means a species is likely to become endangered within the foreseeable future. The ESA is administered by the USFWS and National Marine Fisheries Service (NMFS) and requires all federal agencies to protect species and preserve their habitats. Section 7 of the ESA dictates that federal actions should not jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species. Furthermore, Section 7(a) of the ESA requires formal consultation with the USFWS whenever a federal proponent anticipates taking any action that may affect a listed species or critical habitat.

No federally listed species are known to occur in Floyd County, although habitat exists for the endangered Indiana bat (*myotis sodalist).* Special-status species (i.e. species tracked by the Commonwealth of Kentucky) known to occur in Floyd County, KY are listed in **Table 5-7**. The three study phase areas may contain special status species that typically occur in riparian or bottomland forests, open fields, or upland mixed woods. The subject areas were not surveyed for state-listed species and it is possible that state-listed species occur within areas to be disturbed.

Table 5-7. Special Status Species Known to Occur in Floyd County				
Scientific Name	**Common Name**	**State Status**	**Federal Status**	**Habitat**
Plants				
Erythronium rostratum	Yellow Troutlily	S	N	Mesic Ravine Forests.
Hydrophyllum virginianum	Eastern Waterleaf	S	N	Moist or Wet Woods, Open Wet Places.
Lathyrus venosus	Smooth Veiny Peavine	S	N	Rich Woods, Thickets, Banks of Streams.
Gastropods				
Patera panselenus	Virginia Bladetooth	S	N	Under Rocks and Logs on Wooded Floodplains, Hillsides, and Ravines (Hubrict 1985).
Bivalves				
Fusconaia subrotunda subrotunda	Longsolid	S	N	Gravel Bars and Deep Pools in Large Rivers and Large to Medium-Sized Streams (Ahlstedt 1984, Goodrich and Van Der Schalie 1944, Neel and Allen 1964, Parmalee 1967).
Quadrula cylindrica cyclindrica	Rabbitsfoot	T	N	Small to Large Rivers with Sand, Gravel, and Cobble and Moderate to Swift Current, Sometimes in Deep Water (Parmalee 1967, Bogan and Parmalee 1983).
Villosa linenosa	Little Spectaclecase	S	N	Inhabits Small to Medium-Sized Rivers, Usually in Shallow Water on a Sand/Mud/Detritus Bottom (Parmalee 1967, Gordon and Layzer 1989).
Insects				
Calopteryx dimidiata	Sparkling Jewelwing	N	N	Open, Sand-Bottomed Streams, Usually with Eel-Grass, is the Preferred Habitat in Florida. Also Occasionally Found in Rivers (Dunkle 1990).
Pseudanophthalmus hypolithos	Ashcamp Cave Beetle	T	N	Under Rocks at Back of Entrance Room of Old Quarry Cave and in Lower of Two Crawlways (Barr 1981). Abundant Cave Rat Debris was Present.
Mammals				
Ursus Americanus	American Black Bear	S	N	Prefers mixed deciduous-coniferous forests with a thick understory, but may occur in various situations including riverine habitat near small creeks and medium sized rivers.
Reptiles				

Table 5-7. Special Status Species Known to Occur in Floyd County				
Scientific Name	**Common Name**	**State Status**	**Federal Status**	**Habitat**
Lampropeltis Triangulum Elapsoides	Scarlet Kingsnake	S	N	Burrows in Soft Soils of Upland Oak and Oak-Hickory Forests, may also occur in Oak-pine.
Birds				
Podilymbus podiceps	Pied-Billed Grebe	E	N	Breeds along rivers, lakes, and reservoirs in shallow water surrounded by dense vegetation.
Falco peregrinus	Peregrine Falcon	E	N	Various open situations including suitable nesting habitats, mountains, open forested regions, and human population centers. Nests typically on ledges of rocky cliffs (Palmer 1988, Campbell et al. 1990).
Circus cyaneus	Northern Harrier	T	N	Marshes, meadows, grasslands, and cultivated fields, Perches on ground or stump posts. Nests on ground in low shrubs.
Ardea Herodias	Great Blue Heron	S	N	Freshwater marshes, low gradient riverine habitat. Nests commonly in trees in forested areas.
Phalacrocorax auritus	Double-Crested Cormorant	H	N	Lakes, ponds, and large river systems. Nests on the ground or in trees
Anus Discors	Blue-Winged Teal	E	N	Marshes, ponds, sloughs, lakes, and sluggish streams. Commonly colonizes newly available habitats. Nests in tall grasses typically near water.
Fish				
Ichthyomyzon fosser	Northern Brook Lamprey	T	N	Small to Medium-Size Upland Streams Where Adults Live in Sand-Gravel Bottoms of Clean Riffles and Raceways (Burr and Warren 1986, Page and Burr 1991). Ammocoetes require Mixed Sand, Silt, and Debris in Quiet Water.
Percopsis Omiscomaycus	Trout-Perch	S	N	Lives in Clear, Small to Moderate-Size Streams in Pools or Raceways over Clean Sand or Mixed Sand and Gravel Bottoms.
Lampetra Appendix	American Brook Lamprey	S	N	Raceways, Riffles, and Flowing Margins of Permanently Flowing Streams and Rivers with Gravel, Sand and Sediment Bottoms (Burr and Warren 1986)
Source: Kentucky State Nature Preserves Commission 2002, Kentucky Department of Fish and Wildlife Resources, 2004. KEY: (E) State-listed as Endangered; (LE) Federally-listed as Endangered; (N) Not listed; (S) State-listed as Special Concern; (H) Historic				

5.10 Cultural Resources

5.10.1 Definition of Cultural Resources

Cultural resources comprise prehistoric and historic sites, structures, districts, or any other physical evidence of human activity considered important to a culture, subculture, or a community for scientific, traditional, and/or religious reasons (36 CFR Part 64). For the purposes of this EIS, based on statutory requirements, the term cultural resources are defined to include:

1. Historic properties, as defined in the National Historic Preservation Act (NHPA) of 1966, as amended (16 USC 470)
1. Sites that are scientifically significant, as defined by the Archeological and Historic Data Preservation Act (AHPA) (16 USC 469-469(c))
2. Collections, as defined in 36 CFR Part 79, Curation of Federally Owned and Administered Collections.

In brief, cultural resources include archaeological, architectural, and traditional resources. *Archaeological resources* consist of locations where prehistoric or historic activity has measurably altered the earth or produced deposits of physical remains, such as arrowheads and bottles.

Architectural resources include standing buildings, districts, bridges, dams, and other structures of historic or aesthetic significance. Architectural resources must generally be more than 50 years old to be considered for inclusion in the NRHP, which is an inventory of culturally significant resources identified in the United States. However, more recent structures, such as Cold War-era resources, may also be eligible for listing in the NRHP if they meet criteria presented below in Section 5.10.3.

5.10.2 Regulatory Framework

NEPA and 32 CFR Part 651 require cultural resources, as defined by the above-stated regulations, to be fully considered when preparing NEPA analyses. The primary regulatory driver for cultural resources protection, restoration, rehabilitation, and/or reconstruction is the NHPA (16 USC 470).

The NHPA establishes the Federal government's policy to provide leadership in the preservation and management of historic properties. Under Section 106 of the NHPA and 36 CFR 800, Federal agencies are required to identify and protect historic properties included in, or eligible for listing on, the NRHP. *Historic properties* may be archaeological sites (both prehistoric and historic), buildings, structures, objects, or districts. The Federal proponent is responsible for seeking the comments of the ACHP under 36 CFR 800 on projects that affect historic properties.

In the State of Kentucky, all Federal projects are reviewed by the Kentucky Heritage Council, which is the SHPO, in accordance with Section 106 of the NHPA, as well as by the Advisory Council on Historic Preservation (ACHP) in accordance with 36 CFR 800.

5.10.3 Significance Criteria

In order for a cultural resource to be considered significant, it must meet one criterion or more for inclusion on the NRHP, as described below:

> *The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association; and: a) that are associated with events that have made a significant contribution to the broad patterns of our history; or b) that are associated with the lives or persons significant in our past; or c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or d) that have yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4).*

Only significant cultural resources warrant consideration with regard to adverse impacts resulting from implementation of a Proposed Action. Generally, but not always, cultural resources must be more than 50 years old to receive protection under Federal laws.

5.10.4 Prehistoric Cultural Context

The history of human activity in Floyd County spans thousands of years. The earliest groups to leave a definitive material record of their presence were early Native American groups who archaeologists have labeled Paleoindians. These peoples entered the region during the Late Pleistocene glacial epoch more than 10,000 years ago. Their descendants, and the descendants of other Native American groups who migrated to the region, lived in the region for the next ten millennia. This long prehistoric era lasted until the beginning of the Historic Period that is marked by the arrival of the first European explorers and settlers in the seventeenth and eighteenth centuries.

While cultural change is a slow and continual process, archaeologists and other researchers divide the human history of a region into distinct cultural periods. Archaeologists and historians recognize four broadly defined prehistoric periods. These include the *Paleoindian* (ca 10000-8000 BC), the *Archaic* (8000-1000 BC), the *Woodland*, (1000 BC-AD 900) and *Late Prehistoric Period* (AD 900-ca 1700). The *Historic Period* began with the arrival of the first European explorers and colonists.

According to the 1990 *Kentucky Heritage Council State Historic Preservation Comprehensive Plan* [*State Plan*] (Pollack 1990), Floyd County lies within the Upper Big Sandy Management Area in the Coalfields section of the of the Appalachian Mountain’s cultural landscape. The following summary is a brief outline of Kentucky archaeological history with descriptions of the appropriate regional cultural phases, artifact types, and site types. It summarizes more detailed discussions presented in the *State Plan* (Pollack 1990), as well as *Kentucky Archaeology* (Lewis 1996), and other resources.

Cultural components in Floyd County are listed in **Table 5-8**.

Table 5-8. Cultural Components in Floyd County (From 2005 Office of State Archaeology (OSA) Site Data)

Cultural/Temporal Component	N=
No Component Data Available	53*
Indeterminate Prehistoric	12
Paleoindian Paleoindian (Early, Middle, and Late)	0
Archaic Period	(24)
Archaic (Indeterminate)	6
Early Archaic	8
Middle Archaic	5
Late Archaic	5
Woodland Period	(12)
Woodland (Indeterminate)	6
Early Woodland	1
Middle Woodland	2
Late Woodland	3
Late Prehistoric Period Late Woodland/Late Prehistoric (Indet.)	9
Total Prehistoric Components	110 **
Historic Components	32
Total Components	**142**

* OSA site files contained no data regarding cultural affiliation for 53 sites.

** A total of 93 sites have been recorded in Floyd County. The number 110 reflects the fact that several have multiple components.

5.10.4.1 Paleoindian Period, ca. 10000-8000 BC

The Paleoindian period (ca. 10000-8000 BC) is the earliest well-documented period of human occupation in Kentucky. It spans the final centuries of the Late Pleistocene glacial epoch when the early groups migrated into the region and adapted to the landscape. Many researchers divide the Paleoindian period into Early Paleoindian, Middle Paleoindian, and Late Paleoindian periods.

The earliest human occupations documented in Kentucky are those dating to the Early Paleoindian Period. Tankersley defines the Early Paleoindian Period (10000-9000 BC) as the period when Clovis groups first entered the region (Tankersley 1996:22-30). These early colonizing groups were very small consisting of one or two family groups. They were highly mobile hunter-gatherers who primarily subsisted by hunting Late Pleistocene fauna like bison, musk ox, caribou, and the now extinct megafauna such as ground sloth, moose-elk, mammoth, and mastodon (Tankersley 1996:26). Most Paleoindian sites are identified as simple isolated finds, with single Clovis points fragments.

According to Tankersley, the Middle Paleoindian period (9000-8500 BC) is marked by increased diversity in fluted point styles (Tankersley 1996:31) as well as a more diverse lithic tool-kit that included spurred end scrapers and side scrapers, and an increased use of lower quality local cherts. Tankersley suggested these changes reflected an increased reliance on smaller game and even plant resources. A distinctive regional fluted point style, the Cumberland point, is found in southern Kentucky along the Cumberland drainage.

By the Late Paleoindian period (8500-8000 BC), fluted projectile points had disappeared and were replaced by points of the non-fluted Dalton Cluster (Justice 1987:35-44; Tankersley 1996:33). The Dalton Cluster points display a much greater stylistic variety reflecting greater regional diversity. There was also a wider range of tools associated with the Dalton toolkit as opposed to the earlier Paleoindian Groups (Tankersley 1996:33). The regional diversity in point styles may indicate more restricted regional settlement systems on the part of these later Paleoindian groups, while the more diverse toolkit composition may indicate more intensive exploitation of a wider range of food resources.

Paleoindian period sites are not well documented in the Upper Big Sandy cultural landscape. According to current OSA site data, no Paleoindian sites have been recorded in Floyd County. It is not known whether the lack of recorded Paleoindian sites reflects a general absence of these groups or is a result of sampling bias (Tankersley 1990:124). Two Paleoindian site, 15PI26 and 15PI96, have been documented in adjacent Pike County that is the only other county within the state included in the Upper Big Sandy Management Area.

5.10.4.2 <u>Archaic Period, ca. 8000-1000 BC</u>

The Archaic period (ca. 8000-1000 BC) spans the 7000 year time span with early Native American in the eastern United States adapted to the changing post-Pleistocene Early Holocene climate. The Archaic includes Early Archaic, Middle Archaic, and Late Archaic sub-periods which are described below.

In many respects, Native American adaptive strategies during the Early Archaic (8000-6000 BC) more closely resembled those of their Paleoindian predecessors than those of the later Middle and Late Archaic periods. Like their Paleoindian counterparts, the early Native American Groups of the Early Archaic were hunter-gatherers who incorporated a great deal of mobility into their subsistence/settlement systems. However, the Early Archaic is generally seen as a transitional period when regional populations more fully adapted to the changing environmental conditions that were taking shape during the Early Holocene (Jefferies 1996). Such “modern” game species as whitetail deer and turkey, and important subsistence plant species like the nut-bearing oak, hickory, and chestnut trees of the spreading deciduous forest replaced the Late Pleistocene fauna and flora (Jefferies 1996:40). The lithic tool kits of the Early Archaic were similar to those utilized during the Paleoindian periods. However, there is evidence for increased regionalization during the Early Archaic, an intensification of trends first observed during the Late Paleoindian period. While these early groups continued to be highly mobile, their seasonal settlement systems were more regionalized, with different bands and macro-bands restricting the seasonal mobility to specific drainages (Anderson and Sassaman 1996). Artifact type markers for the early portion of the Early Archaic include Kirk Corner Notched points, and Thebes Side Notched points (Jefferies 1996; Justice 1987). Later Early Archaic point types include Kirk Stemmed points and bifurcate based LeCroy and Kanawha points (Jefferies 1996; Justice 1987).

In the eastern mountains, documented Early Archaic sites are typically found in the narrow floodplains, though some upland ridge and side bench sites have been documented in Floyd County (Jefferies 1990:216). Eight Early Archaic Sites have been documented in Floyd County. According to OSA site data, all were open-air habitation sites found in the uplands and on river terraces.

By the onset of the Middle Archaic period (6000-3000 BC), early Native American populations had begun to settle down into increasingly regionalized settlement ranges. Middle Archaic sites along the Green River drainage and elsewhere included large base camps used as long-term, perhaps even year-round residential sites (Jefferies 1996:54). These changes in settlement strategy coincided with the long warm, dry spell which climatologists call the *Hypsethermal Climatic Interval*. Much of Kentucky became arid grasslands and the distribution of subsistence game and plant resources was more restricted than in previous periods. Though the period is poorly understood in Kentucky, it is generally recognized as a period of intensive regionalization when groups began to exploit a wider range of local subsistence resources. Middle Archaic artifact assemblages include ground stone tools and pecking stones generally attributed to plant food processing. Middle Archaic groups were able to access a variety of subsistence resources, and were able to limit their residential mobility. A plethora of stylistically distinct project point types with limited distribution ranges appeared during this time including Morrow Mountain, Matanzas, and Big Sandy II points (Jefferies 1996:47; Justice 1987).

Five Middle Archaic site have been documented in Floyd County. These are located in the river floodplain and in the upland.

During the Late Archaic period (3000-1000 BC), the number of prehistoric sites scattered across the Kentucky landscape increased dramatically. The diversity of those sites present in the landscape increased as well Late Archaic subsistence/settlement strategies emphasized generalized hunter/gatherer strategies and these groups intensively exploited a range of subsistence resources in a variety of environmental settings (Collins and Driskell 1979; Jefferies 1996:64-65). There is also clear evidence for increased sedentism at numerous sites where human and dog burials occur, along with large trash pits and hearths (Anslinger 1988). By the end of the Archaic, there is evidence for incipient horticulture, basket weaving, and a variety of tools for woodworking and food processing (Watson 1974). Late Archaic site types included large base camp sites on floodplains as well as the interior lowlands. Large shell mounds appeared during the Late Archaic, either built intentionally by Late Archaic groups, or built up over time through repeated utilization of the same location. The sites also yielded diverse artifact assemblages indicative of long-term residential activities. Smaller resource extraction sites are scattered throughout the full range of geographic settings in the region. Projectile points indicative of Late Archaic occupations include McWhinney stemmed, Merom-Trimble Cluster, and Brewerton points (Jefferies 1996:64).

Late Archaic sites in the eastern mountains are primarily known from rockshelter sites and along narrow stream valleys (Jefferies 1996:65). Five Late Archaic sites have been recorded in Floyd County. The major regional Late Archaic cultural phase in the Upper Big Sandy Management Area of the state is the Slone dating to around 1900 BC. Dunnell first identified the Slone Phase at sites identified during survey of the proposed Fishtrap Reservoir along the upper Levisa Fork (Dunnell 1972:25-27). The Slone Phase sites appeared to be small seasonally occupied floodplain settlements with no evidence for substantial structures and sparse artifact assemblages (Dunnell 1972:27-32; Jefferies 1996:67). The artifact assemblages recovered from Slone Phase sites included pestles, ground metates, nutting stones, chipped stone axes, bifacial knives, various stemmed projectile points, and tools made from siderite (ironstone) (Dunnell 1972:30; Jefferies 1996:67-68).

5.10.4.3 Woodland Period, ca. 1000 BC-AD 1000

The division of the Early Woodland (1000-200 BC) from the proceeding Late Archaic is marked by the appearance of ceramic pottery around 1000 BC. Many Early Woodland projectile point types are indicative of transitional Late Archaic/Early Woodland occupations including Kramer, Wade, Savanna River, Saratoga stemmed, Buck Creek Barbed, and various other stemmed points (Justice 1987; Railey 1996). Early Woodland sites are similar in type and distribution to those during the Late Archaic. Large midden sites are located in the alluvial valleys and smaller resource procurement sites are found scattered throughout the landscape. However, the Early Woodland also has the first appearance of distinct ceremonial sites. Numerous large Adena burial mounds dating to the early Woodland Period appeared throughout the Central Ohio River Valley. There is also evidence for widespread horticulture of such domesticated plants as gourds and sunflowers (Railey 1996).

Only one Early Woodland site has been recorded in Floyd County. However, elsewhere in the Big Sandy drainage, several Early Woodland ceremonial sites have been found along the lower portions of the river including several burial mounds. According to OSA files, two earth mounds (15PI4 and 14PI83) have been reported in adjacent Pike County but these are of unknown cultural/temporal affiliation. Webb and Funkhouser reported a third possible earth mound at site 15PI5, but stated it had been destroyed by agricultural activities (Webb and Funkhouser 1932:340).

Throughout the eastern mountains, Early Woodland sites are well documented in rockshelters as well as along the region’s narrow floodplains where early woodland camps were located. In neighboring Pike County, the Early Woodland Thacker Phase was identified by Dunnell in the Fishtrap Reservoir. These sites were similar to the Late

Archaic Slone Phase site with the addition of quartz-tempered ceramics and stone lined earth ovens (Dunnell 1972:32-39; Railey 1996:88). Dunnell did not distinguish the Woodland period in his initial discussions of Pike County archaeology and described the Thacker Phase as an “Archaic” aged cultural phase dating circa 1000 B.C. (Dunnell 1972:74-75). In accordance with current temporal divisions followed by Kentucky archaeologists, Thacker Phase sites should be considered Early Woodland sites due to the presence of prehistoric ceramics. Thacker Phase sites were typically very small averaging only 35 square meters and the artifact assemblages were very sparse (Dunnell 1972; Railey 1996:87).

Complex ceremonialism continued through the Middle Woodland period (200 BC-AD 600). Sites with multiple smaller burial mounds and non-mound earthworks such as circular and geometric enclosures and animal effigy mounds replaced the construction of large individual Adena burial mounds. These later cultural manifestations are generally described as part of the Hopewell tradition. In addition to construction of elaborate earthworks, early Native American groups participating in the Hopewell tradition also engaged in long distance trade of various material goods such as high quality lithic material, copper from the Great Lakes, mica, and conch shells from the Gulf of Mexico and Atlantic Coast. Sophisticated mortuary practices suggest the appearance of hierarchical social organization and long-range trade (Railey 1996:88). Though hunting and gathering continued to be the major source of subsistence food, the use of horticulture intensified and permanent settlements were firmly established along river bottoms (Prufer and McKenzie 1967). A number of plants were domesticated including sunflower, maygrass, knotweed, little barley, and goosefoot. Other plants included maize, squash, and gourds (Railey 1996:90).

Floyd County has yielded little evidence of the Complex Hopewell ceremonialism found along the Ohio River Valley. According to OSA data, only two Middle Woodland sites are known. Middle Woodland occupations within the Upper Big Sandy River area elsewhere are represented by the Middle/Late Woodland Sims Phase sites identified by Dunnell along the Upper Levisa Fork in Fishtrap Reservoir (Dunnell 1972:39-45; Railey 1990:327). Sims Phase sites were similar to preceding Early Woodland Thacker and Late Archaic Sloan phases. The sites were small and contained relatively few artifacts. Sims Phase sites included stone lined earth ovens, pits, and structures. Ceramics were a quartz-tempered cordmarked or plan variety. There were no elaborate trade items recovered from the Pike County Sims Phase sites to suggest extensive interaction with the elaborate Hopewell cultures along the Ohio River to the north and northwest.

A major technological change, of the Late Woodland period (AD 500-1200), was the introduction of the bow and arrow around AD 700-800 (Railey 1996:111). This was indicated in the archaeological record by the appearance and proliferation of small triangular points. Other chipped stone tools diagnostic of the Late Woodland include Jacks Reef Corner Notched, Commissary knives, and small triangular Madison points believed to be arrow heads (Railey 1996). Increasing regional variability of stylistic motifs on ceramic pottery became pronounced throughout the Late Woodland. Subsistence/settlement strategies continued the trend toward increased sedentism. Small, nucleated circular villages with circular central plazas appeared in some locations of the state by the Late Woodland (Railey 1996:111-112). The appearance of aggregated settlement may, in part have resulted from an increased population density and shrinking settlement ranges. Along with aggregating into central village locations, Late Woodland populations adopted intensive horticulture of maize and domesticated plant seed plants.

The major Late Woodland cultural manifestations in Floyd County are included in the Middle/Late Woodland Sims Phase described above. According to OSA data, three single component Late Woodland sites have been identified in the county.

5.10.4.4 Late Prehistoric Period, ca. AD 900-1700 (Fort Ancient Culture)

By the Late Prehistoric Period (ca. AD 900-1700), north, central, and eastern Kentucky was dominated by cultural groups who were part of the Fort Ancient cultural tradition. The Fort Ancient tradition was a local manifestation of Late Prehistoric cultural development and coincided with the development of the Mississippian culture to the southwest along the Mississippi and Lower Ohio Rivers as well as along the Cumberland River to the south. Both cultural traditions are marked by increased dependence on maize agriculture, the use of shell-tempered pottery with regionally distinct stylistic motifs, and the concentration of the population into relatively large towns and villages. Mississippian culture was hierarchical chiefdom level societies that were characterized by a hierarchical series of residential sites that included large ceremonial towns with rectangular central plazas flanked by large platform mounds on which the chief or chiefly clan built their houses. Other site types included smaller agricultural villages, hamlets, and farmsteads. Structures at Mississippian sites were typically rectangular houses and many of the larger Mississippian villages were surrounded by wooden palisades. Subsistence was largely based on maize agriculture augmented by beans and squash as well as some hunting and gathering.

Like contemporaneous Mississippian groups, Fort Ancient culture was overwhelmingly dependent on maize agriculture and its social organization was fundamentally organized around the organization of agricultural activities. However, though Fort Ancient phases and traditions are generally thought to have been chiefdom level societies, they appear to have lacked the seemingly rigid social hierarchy of the Mississippian cultures to the west. Fort Ancient villages were typically circular or elliptical in shape with circular central plazas around which small houses were built. The central plaza was the site of social and ceremonial activities, but unlike the Mississippian village sites, there were no platform mounds. Instead, the mounds were part of complex mortuary practices and were located on the edges of the plaza. The material culture of Fort Ancient culture includes shell tempered pottery and a variety of ceramic vessel forms including jars, bowls, and pans (Sharp 1996). Lithic artifact assemblages were typically limited to simple tools such as small triangular points (Justice 1987). The presence of marine shell and catlinite disk pipes at Fort Ancient sites points to participation in long-distance exchange networks and interaction spheres (Sharp 1996).

Nine indeterminate Late Prehistoric sites have been documented in Floyd County. However, Fort Ancient sites have been identified in adjacent Pike County including 10 Fort Ancient sites identified by Dunnell (1972:45-60) in the Fishtrap Reservoir. Dunnell defined the Fort Ancient Woodside Phase from Fishtrap Reservoir sites which he proposes to be representative of Fort Ancient occupation throughout the eastern mountains in the Big Sandy and Kentucky River drainages (Sharp 1996:177). These sites dated from AD 1200 to AD 1500. The material assemblages recovered from Woodside Phase sites included numerous triangular projectile points and ceramic types that included plain surfaced, roughened surface, and later cord marked shell-tempered ceramics (Dunnell 1972; Sharp 1990:526-527). Woodside Phase sites included both villages and camps. In typical Fort Ancient fashion, Woodside Phase villages consisted of several houses arranged around a circular plaza. Many villages such as the Slone site (15PI11) were surrounded by palisades, though others such as the Mayo site on Paint Creek in Johnson County were not. The Slone site was one of eight Fort Ancient Villages identified by Dunnell in the Fishtrap reservoir. The site was a 62 to 76 m wide circular village with a palisade. Carbon dates from the site indicate an occupation dating to the late fourteenth or early fifteenth century (Dunnell 1972; Sharp 1990:526). Features found at the Slone site included rectangular houses with centrally located hearths, basins, earth ovens, and rock- or pot sherd-lined storage pits. Burials were often lined with stone slabs and were placed between the houses and the outside palisade. Woodside camp sites were small briefly occupied sites with few if any associated features. Artifact assemblages consisted of chipped stone debitage, projectile points, and cutting and scraping tools. Pottery, animal bone, and shell are not common at Woodside camps (Sharp 1996:177).

5.10.4.5 Protohistoric Period, ca. AD 1540-1795

The term protohistoric frequently refers to the native culture of North America during that span of time following the first influence of European cultures (principally through trade goods or disease), and later, when the native cultures were recorded and described by the encroaching Euro-American cultures. Typically during this period, the native cultures underwent acculturation - a virtual breakdown of their former way of life through replacement by or approximation of the cultural norms of the dominant culture.

Henderson et al. (1986) refers to the Protohistoric period as beginning when the first indirect effects of the European presence were felt by native cultures, roughly AD 1540. The beginning date was selected based on journals of the De Soto expedition in the 1540's observing that trade goods and European disease were there before them. The signing of the Greenville Treaty in 1795 marks the end of this period. In that document, the Indians relinquished all claims to land in the region to the new government of the United States. The several tribes in various stages of acculturation were removed to small reservations to the north and west (Henderson et al. 1986:1,17).

The Protohistoric period spans nearly two centuries, ending around AD 1795. The inhabitants of the region during this period probably consisted of diverse groups speaking Algonquian or Iroquoian languages, and basing their economies on a combination of horticulture and fishing, hunting, and gathering. Small encampments at scattered locations sometimes coalesced into larger villages on floodplains in the spring for the cultivation of corn, beans, squash, and a few other selected plants, like tobacco.

During this period, in what is now Kentucky, contact between Native Americans and Europeans may have been indirect, with European trade goods and information about Europeans spread through the existing Native American exchange systems. The earliest European exploration of what was to become Kentucky had not been established, but Marquette and Joliet passed the mouth of the Ohio in 1673 during their exploration of the Mississippi River. Other French, English, and Spanish traders and explorers may have passed through the territory in the late seventeenth to mid-eighteenth century as well (McBride and McBride 1990:583).

Disease increasingly reduced native populations all over the central and eastern parts of the continent during this period. In this region, epidemics are documented from the last decades of the 1500s and into the mid-1600s.

5.10.5 Historic Cultural/Historical Context

5.10.5.1 The Appalachian Region Cultural Context

Floyd County lies within the heart of the Appalachian cultural region. Geographically, Appalachia is an overlapping system of mountain ranges that runs from Maine to Georgia and includes the Adirondack, the Allegheny, the Blue Ridge, the Cumberland, and the Great Smoky. These mountains cover a total of 2,050 miles down the eastern portion of the country. A total of 397 counties are included in Appalachia in the states of Alabama, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia. In Kentucky, the Appalachian Region is an 80-x-110-mi (129-x-177-km) region that contains 20 counties, including Floyd County.

The development of the Appalachian subculture occurred in five phases: pre-Civil War culture; Civil War developments; the “discovery” of Appalachia; the discovery of natural resources; and modern culture. The evolution of this subculture defines not only perceptions towards the region, but its economic and industrial growth.

5.10.5.2 Early Settlement in the Appalachian Region

Spain was the first country to explore the Appalachian Region, naming it after the Apalache. However, it was the British and the French who fought over land rights and fur trade until the British triumphed in 1763. With this triumph, the British held the 13 colonies and the Appalachian Region. While the British King intended to raffle off tracts of land in Appalachia, new immigrants and former indentured servants began to view the area as a place to establish their own respective land holdings where they had little taxation, lots of land, and religious freedom. Settlement increased after the American Revolution, and the area became a gateway to the west.

As Kentucky moved into statehood in 1792, the character of the Appalachian Region became evident. While still considered the backwoods and unsafe due to the threat of

Native American tribes, it was viewed as the gateway to further exploration. The agrarian economy of farming and livestock provided the people with a crude sort of capitalism that kept them on par with the rest of the nation. The number of travelers through the region kept the settlers abreast of national news. The clan ties became more imperative due to isolation from neighbors and the newly implemented yeoman-style system of dividing one's land between his heirs. Despite the huge geographical separation of the mountains and the perception of the Appalachian Region as wild and untamed, the lifestyle of the "mountaineer," as residents of the region were called, did not differ greatly from that of any other citizen.

It was in this cultural climate that Floyd County was created on 13 December 1799 (effective 1 June 1800) as the state's 40th county. It was created out of Fleming, Mason, and Montgomery counties and named after pioneer surveyor and explorer John Floyd (Kleber 1992). Although settled in 1790 by William Robert Leslie, the county was part of the untamed West with a long history of having been a Native American hunting ground (Kleber 1992).

5.10.5.3 Civil War Developments (1861-1865)

Prior to the Civil War, settlers within the Appalachian Region were still active in the nation's economy and political scene. Between 1861 and 1865, three changes occurred that forever affected the Appalachian Region's social and financial growth: the breakdown of political stability, the breakdown of the economic system, and the further isolation of the area that strengthened familial ties.

The issue of slavery as the labor foundation of the south affected the Appalachian Region. Slavery was prominent in the southern parts of the region, but not as great a necessity as in the Deep South. For the mountaineers, slavery represented a political system more so than a labor system. While there were both Union and Confederate sympathizers in the southern region, the issue for the mountaineers was government stability. While many mountaineers disliked slavery and eventually phased it out, their greater concern was how the national government would be affected by the secession of the southern states in an attempt to maintain their economic system (Drake 2001:94). As Kentucky itself divided over the issue of secession, with a Union government in Frankfort and a Confederate government in Richmond, mountaineers turned to local politics and family units for leadership. The national government had dissolved, to their way of thinking, and political stability was over. Floyd County represented this disparity. Although the county seat of Prestonsburg was a Confederate sympathizer, two Union victories occurred, the Battle of Ivy Mountain on 8 November 1861 and the Battle of Middle Creek on 10 January 1862. In addition, it was Union engineers that first recognized the seams of bituminous coal in the county and informed northern industrialists of these resources (Kleber 1992).

Alongside the breakdown of political stability was the collapse of the economic system in the Appalachian Region. Prior to the war, the yeoman system of farming had been successful enough to warrant the construction of schools, churches, and other such institutions (Drake 2001:111). Agriculture and livestock provided families with an economic foundation. During the war, these resources were raided and much of the construction destroyed. With the breakdown of their economic system, many mountaineers did not have the financial foundation to rebuild their livelihood. In addition, as people moved out west, the Appalachian Region was recognized as difficult to farm, whereas the west had open prairies for farmland and livestock.

Isolationism had both a geographical and a cultural meaning in the Appalachian Region. By the Civil War, it was a choice. The result of the breakdown in politics and economics was cultural isolation exemplified by the retreat of the residents of the region into their hollows. Family ties became even stronger as mountaineers trusted only those extended family members who lived on land divided off of the original tract and family members brought in by marriage. The isolationism of the region and the extremely close familial ties came to define law, order, and justice in the region, excluding then the government and their place in it (Drake 2001:108).

5.10.5.4 The "Discovery" of the Appalachian Region

As early as 1861, people began to recognize the Appalachian Region as a cultural landscape with the writings of Arnold Guyut, who used the term "Appalachian Region" and "Appalachia" to describe both the geography and the people (Drake 2001:11). After the Civil War, though, intellectuals began truly identifying the region as such and intellectuals streamed into the area to study and write about it. It was these writers that created the stereotypes of Appalachia that remain today.

5.10.5.5 The Discovery of Natural Resources

For many domestic and foreign financiers looking for a place to invest their capital, the virtually untapped mountains of the Appalachian Region appeared to be a winner. While natural resources had been mined prior to the Civil War, transportation of these materials hindered any true development. Initially timber was the main industry in Floyd County after 1837 when the first steamboat navigated the Levisa Fork of the Big Sandy River. Lumber would be a dominant industry until 1910.

After the Civil War, the railroad industry exploded in the area. By the late nineteenth century, tracks were laid in eastern Kentucky, allowing the transportation of greater amounts of timber to more markets. Floyd County's first rail line was constructed in 1903. By 1907, Kentucky reached its peak in lumber production and ranked fifteenth in the nation (Raitz and Ulack 1984:191). In addition, because of the timber and railroad industries, awareness grew about the regions untapped coal and natural gas resources.

When the timber industry began to wane, the coal industry flourished due in part to railroad activity. Comprised of 150 small lines, the Chesapeake and Ohio (C&O) was the first railroad in the area (Chesapeake and Ohio Historical Society 2002). Between 1869 and 1873, track was laid across West Virginia. The advancement of the coal industry in other states caused the C&O to implement coal runs in its strategy by running its lines in with the "Big Four" lines: Chicago, Cleveland, Cincinnati, and Louisville. In Floyd County, several mining companies moved into the area at the same time, including the

Northeast Coal Company, the Middle Creek Coal Company, and the Colonial Coal and Coke Company (Kleber 1992). Because of the new transportation routes, by 1910 the eastern Kentucky coal mines out produced those found in the western areas of the state.

5.10.5.6 End of the Agrarian Economy

Initial surveys of the eastern Kentucky coal fields began in the 1880s when Richard Broas of New York City examined the Levisa and Tug Forks. By 1910, in-state and out-of-state investors had developed the area, including Charles E. Hellier's Big Sandy Coal Company out of Boston and Kentuckian John C. Mayo's Northern Coal and Coke Company, into the highest producer of coal in the state (Eller 1982:143). The ramification of this growth was again the breakdown of the economic basis of the region. While the yeoman style of land ownership had slowly disintegrated due to the Civil War and the shortage of land from years of dividing it between family, subsistence farming had become vital to the area. With the obvious economic gains of the investors, many farmers decided to work the mines in an attempt to receive a steady paycheck and possibly a better lifestyle. Farming became a financial support to the supposedly steady mining paycheck and was the responsibility of the women and children.

The other cause of the end of the agrarian lifestyle was the manner in which coal company claimed the land. When mining companies entered the area, agents utilized local inexperience in land laws, economics, and negotiation to purchase lands for as little as a mule and a saddle. When railroads came into the area, these farmers began to realize that they had lost control of their land.

5.10.5.7 Immigration

Unlike most of Appalachia, Kentucky experienced mass immigration when the coalfields opened. Whereas northern coalfields refused to let African Americans citizens work the mines, Kentucky opened her mines to all workers while maintaining policies of segregation. Tempted by offers of free transportation, steady wages, and housing, African Americans began moving into the area in an attempt to escape sharecropping, prejudice, and poverty found in the Deep South. In addition, miners from abroad came to eastern Kentucky to escape religious and political persecution. Management positions were often filled with men from Great Britain who saw an opportunity to use their experience and work in a higher paying position than in England. Italians, Germans, and Russians also immigrated to the area, although the majority ended up being migrant workers, moving their families as newer coal seams opened.

5.10.6 Modern Appalachian Culture

The coal mining industry was relatively unfettered by government regulations until the 1970s. Strip mining occurred in many counties, causing extensive damage to the area. As technology improved, the use of manual labor declined, and many miners found themselves laid off with no notice and no savings. Because the land was decimated, many could not return to working the land. Despite a huge upswing in population in the area in the 1970s due to another coal mining boom, it was still recognized as having a high poverty level. Because of a lack of education, many miners have no alternative but to work the mines. Today, many of the counties in the Appalachian Region, including Floyd County, are trying to diversify their economy through such industries as education, tourism, and manufacturing.

5.10.7 Existing Conditions

The following sections detail previous investigations within the project APE and vicinity, and provide summary information on currently recorded archaeological sites and historic properties.

5.10.7.1 Prehistoric Surveys and Sites

Ten archaeological surveys have been conducted within 2.0 kilometers of the project area. These are summarized below. Archaeological sites recorded as a result of these investigations are presented in **Table 5-9**.

On November 10, 1977, Archaeological Services, Inc. conducted a pedestrian Phase I survey of 22 acres for the proposed Cliffside Housing Project. This project was located approximately 1.6 kilometers northeast of Cliff, Kentucky, 1.2 kilometers northeast of the mouth of Abbot Creek (Turnbow 1977). One archaeological site (15FD4), a prehistoric rockshelter, was documented. Additional archaeological investigation was recommended to further define subsurface deposits.

In July 1989, Dr. Jack M. Schock of Arrow Enterprise, Inc. conducted an archaeological survey of approximately 17 miles for a proposed power line from Prestonsburg in Floyd County to Paintsville in Johnson County, Kentucky (Schock 1989a). One prehistoric site, 15FD51, was located. No additional investigation of site 15FD51 was recommended because no subsurface disturbances were proposed at the site location. Two rock overhangs and one historic cemetery that contained multiple graves dating from 1892 through 1928 were identified outside the proposed project limits.

In August 1989, Dr. Jack Schock of Arrow Enterprises returned to Floyd County to conduct an archaeological survey of approximately 13 miles in length for a proposed power line Prestonsburg in Floyd County to Sublett in Magoffin County, Kentucky (Schock 1989b). No archaeological sites were located within or adjacent to the proposed project area.

In September 1989, the University of Kentucky conducted a historic documentary research and a pedestrian archaeological survey were performed for a tract of land measuring approximately 50 by 60 meters on South First Street in Prestonsburg, Kentucky (O'Malley 1989). The tract contained a log frame house that was likely one of Prestonsburg's earliest buildings. Built by Solomon DeRossett between 1800 and 1815, the log structure may have served both as a residence and a fur warehouse. The house remained in the DeRossett family until 1853 when Solomon's heirs sold it to Hugh Harkins. Harkins' daughter, who married a man named "Johns", acquired the house in 1874, and it has remained in her family's possession since that time. Also documented on this survey were four early to mid-twentieth century houses. One was built by

William Dingus and stood immediately north of the DeRossett-Johns House. Three small rental houses also stood behind the DeRossett-Johns House. All five houses and associated archaeological deposits were documented as a single historic archaeological site (15FD50). 15FD50 was judged to be potentially significant on the basis of its contribution to and importance in Prestonsburg's early historic settlement era.

In July 1991, personnel from Cultural Resources Analysts, Inc. (CRAI) completed a Phase I archaeological assessment of a proposed coal mine operation in Floyd County (Hand 1991). The project area comprised approximately 763 acres, of which 431 were surveyed. Three historic sites (15FD58, 15FD59, and 15FD60) were recorded during this survey. Site 15FD58 consisted of chimney fall, foundation stones, and a sandstone-lined well. No temporally diagnostic historic artifacts were recovered from this site. No further archaeological investigation was recommended for site 15FD58. Two isolated sandstone wells (sites 15FD59 and 15FD60) were discovered within the project area. No farmstead materials were found in association with either of the two wells. No further work was recommended for either site 15FD59 or site 15FD60.

In October 1994, CRAI personnel completed a Phase I archaeological assessment of a proposed coal mine operation in northern Floyd County (Hand 1994). The project area consisted of approximately 230 acres. No historic or prehistoric sites were located with the project area.

In December 1996, CRAI was again in Floyd County to complete a Phase I archaeological assessment of a proposed Dewey Lake Land Transfer Area at Jenny Wiley State Park (Richmond 1996). The survey consisted of approximately 271 acres. No historic or prehistoric sites were located with the project area.

The University of Kentucky's Program for Cultural Resource Assessment (PCRA) conducted an archaeological survey of two alternate routes for the re-alignment of a 2.4-mile section of KY 114, near Prestonsburg, in Floyd County in November 1997 (Davis 1998). A previously identified site (15FD27) was relocated during this survey. However, 15FD27 appeared to lie approximately 600 meters southeast of a previously reported location and was more precisely mapped east and west of the intersection of KY 404 and KY 114. Site 15FD27 is a multicomponent site located on a terrace of Middle Creek that contained a light lithic scatter of indeterminate prehistoric affiliation and a previously unrecorded historic component. Prehistoric artifacts were found strewn across the site, but the majority of the lithic scatter occurred in the western half. The historic component was found on the edge of the terrace, at the southeastern edge of the site, and appeared to be related to a house shown on an 1862 map of the Middle Creek Battlefield. The house was identified on this map as belonging to "J. Spradlin." Historic artifacts exhibited a limited spatial distribution, but were associated with dark soil, that could be midden.

The historic component of 15FD27 was directly associated with the Civil War Battle of Middle Creek, and is located on the battlefield that is listed on the NRHP. There is a probable midden associated with historic portion of site 15FD27, and a strong potential for intact subsurface features. The historic component of Site 15FD27 is considered potentially eligible for listing to the NRHP due to a high research potential to address issues concerning historic changes in market access, settlement patterns, and the possible role of the house on the Middle Creek. It was recommended that the site be avoided by proposed project impacts, or subjected to Phase II evaluation. A prehistoric open-air occupation at 15FD27 does not warrant further archaeological investigations due in part to the lack of diagnostic artifacts and lack of stratified deposits, subsurface features, or midden. Therefore, the prehistoric component of Site 15FD27 is not considered eligible for listing in the NRHP.

In September 2001, CRAI personnel completed a Phase I archaeological survey of the proposed Stratton Branch Boat Ramp, Jenny Wiley State Park in Floyd County (Moore 2001). The survey area encompassed approximately seven acres. No archaeological sites were recorded.

AMEC Earth & Environmental, Inc. conducted an intensive Phase I archaeological investigation in Floyd County for a proposed access road near Jenny Wiley State Park in December 2002. No archaeological sites were recorded during this project (Peterson 2002). Two modern cemeteries, less than 50 years old, were identified, but were not recorded as archaeological sites. No NRHP-listed or eligible properties were documented within the project area.

There are nine previously recorded archaeological sites within 2.0 kilometers of the project area, namely: 15FD4, 15FD5, 15FD6, 15FD7, 15FD23, 15FD50, 15FD51, 15FD58, 15FD60 (**Table 5-9**).

Site 15FD4 is a cave or rockshelter with an unknown cultural affiliation. The site is located within a forested area and yielded debitage, shell, human skeletal elements, faunal remains, and groundstone artifacts. The significance of the site relative to NRHP eligibility criteria has not been assessed. However, based on the likelihood of human burials, the site should be considered NRHP-eligible.

Site 15FD5 is an open-air prehistoric camp with an unknown cultural or temporal affiliation. It is located within an agricultural field and contained debitage. Its NRHP eligibility has not been assessed.

Site 15FD6 is an open-air prehistoric site dating to the Woodland period. It is located within an agricultural field. Investigation of this site produced chert debitage, chipped and groundstone artifacts, ceramic sherds, shell, and faunal remains. The site has not been evaluated for its NRHP eligibility.

Site 15FD7 is recorded as a prehistoric “village” with an unknown cultural affiliation. The early investigations of the site produced debitage and ceramics. The NRHP eligibility of the site has not been assessed.

Site 15FD23 is a prehistoric site with an unknown cultural affiliation. The site type is not recorded on the OSA database. The only artifact class documented for the site is mica.

Mica is known to have been obtained prehistorically from the Appalachian Mountains. The site has not been evaluated for its NRHP eligibility.

Site 15FD50, discussed in more detail above, is a historic residence. It is located on a vacant lot in downtown Prestonsburg and appears to be largely undisturbed. The site was named the Solomon DeRossett House (FDP 7) for an early resident and is listed on the NRHP.

Site 15FD51 is prehistoric open-air habitation with a Fort Ancient cultural affiliation. It is located within an agricultural area. Interestingly, the site investigation yielded only prehistoric ceramics. The NRHP eligibility of the site has not been assessed.

Site 15FD58 is a historic farmstead or residence that likely dates to the period of 1901-1950. It is located within a forested area. The survey of this site yielded container glass and bottles, along with whiteware sherds. The site's NRHP eligibility has not been assessed.

Site 15FD60 is a historic farmstead or residence dating within the general period of 1851-1950. It is located within a forested area and appears to be undisturbed. It contained a sandstone-lined well. Site 15FD60 is not considered eligible for listing to the NRHP.

Table 5-9. Previously Recorded Archaeological Sites within 2.0 km of the Project Area									
	15FD4	**15FD5**	**15FD6**	**15FD7**	**15FD23**	**15FD50**	**15FD51**	**15FD58**	**15FD60**
Site Type	Cave or Shelter	Camp	Unknown	Village	Unknown	Historic Farm/Residence	Open Habitation without Mounds	Historic Farm/ Residence	Historic Farm/ Residence
Present Use	Forested	Agricultural	Agricultural	Educational	Recreational	Vacant urban lot	Pasture	Forested	Forested
Period	Unknown	Unknown	Woodland	Unknown	Unknown	Historic	Fort Ancient	Historic (1901-1950)	Historic (1851-1950)
Condition	Poor	Fair	Good	Good	Fair	Undisturbed	Disturbed	Undisturbed	Undisturbed
Site Content	Debitage; Shell; Human and Fauna Remains; Ground Stone	Debitage	Debitage; Chipped and Ground Stone; Ceramics; Shell; Fauna Remains	Debitage; Ceramics	Exotic Goods (Mica)	Multiple Historic Artifacts (Solomon DeRossett House)	Ceramics	Glass, Bottles, Whiteware	Sandstone Lined Well
Significance Status	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed	National Register Property (FDP7)	Not assessed	Not assessed	Does not meet NRHP criteria

5.10.7.2 Historic Properties Investigations and Sites

Eighteen historic sites in Floyd County, including two historic districts, a Civil War Battlefield, eight residences, two bridges, one individual business, a post office, a church, and one archaeological site are listed in the NRHP. Sixteen of the eighteen listings are in the City of Prestonsburg. The historic sites are summarized in **Table 5-10**, and locations of those within Prestonsburg (except for the archaeological site) are shown in **Figure 5-8**.

In 1995 an architectural reconnaissance was made of the structures that would be impacted by the project as part of the Levisa Fork Survey (Amos 1995). The project area covered under the 1995 reconnaissance included the floodplain along the main stem Levisa Fork from Louisa, Kentucky, to the downstream city limits of Grundy, Virginia, (approximately 100 river miles excluding Fishtrap Lake), and along the main stem Russell Fork from its confluence with Levisa Fork to and including Haysi, Virginia (approximately 31 river miles). This included those residential and nonresidential units that would be damaged by a recurrence of the April 1977 flood. Amos viewed 5,788 structures within the study area and recommended that 292 structures be evaluated for their potential historic significance.

5.11 Socioeconomic Resources and Environmental Justice

5.11.1 Population

Floyd County, with a population of 42,441, is home to approximately 16,881 households. Approximately 3,612 people live in Prestonsburg, generating approvimately 1,563 households. (U.S. U.S. Census Bureau, 2000 Decennial U.S. Census and County Business Patterns 1998-2001).

Historically, Floyd County's population has mirrored the growth and decline of coal mining and timber industries. Population growth occurred between 1900 and 1950 at varying rates and peaked in 1980 at 48,764. This was primarily as a result of increases in coal mining spurred by increasing energy prices. Since 1980, however, population has declined as mining technological advances have reduced the demand for workers. Population is forecast to continue declining through the year 2030. Population projections for Floyd County are shown in **Table 5-11**.

Table 5-10. National Register of Historic Places Listings, Floyd County, Kentucky				
Site Name	**Date Added**	**Site ID**	**Address**	**Description**
G. D. Callihan House	1989	Building #89000389 Also known as FD-67	105 W. Graham St., Prestonsburg	Significant for Architecture during the period 1925-1929, this structure was built by Ellis,Hubbard & Harris in the Bungalow/Craftsman architectural style. The house is privately owned and is currently used as a residence.
B.F. Combs House	1989	Building #89000390 Also known as FD-68	41 N. Arnold Ave., Prestonsburg	Significant for Architecture during the period 1900-1924, this structure was built by Tyson & Foster, Archer & Dean in the Colonial Revival architectural style. The house is privately owned and is currently used as a residence.
Fitzpatrick--Harmon House	1989	Building #89000388 Also known as FD-66	102 E. Court St., Prestonsburg	This structure is significant for Community Planning and Development as well as Architecture during the period 1875-1899. The architectural style is Late Victorian. The structure was demolished in 2000.
Front Street Historic District	1989	District #89000398	Roughly Front St. between W. Court St. and Ford St., Prestonsburg	This area is significant for Community Planning and Development as well as Architecture during the period 1900-1949. The architectural styles include Chicago and others. The district's historic function was Commerce/Trade, Domestic, Social, and Transportation. Portions have been modified: the old Elizabeth Hotel (later a hospital) and the high school were demolished in 2004.
Garfield Place	1988	Building #74000871 Garfield Headquarters; John M. Burns House	2nd Ave., Prestonsburg	Significant for Military, Politics and Government, this structure is associated with General James A. Garfield and was used as a military headquarters in 1862 and 1857. The structure was demolished and replaced by the Community Bank.
Harkins Law Office Building	1989	Building #89000395 Also known as FD-2	1 S. Arnold Avenue, Prestonsburg	This structure is significant for Community Planning and Development as well as Architecture during the period 1900-1924. The architectural style is Classical Revival. The structure is privately owned and retains its original function of professional office space.
Joseph D. Harkins House	1989	Building #89000394 Also known as FD-69	204 N. Arnold Avenue, Prestonsburg	This structure is significant for Architecture during the period 1900-1924. The architectural style is Mission/Spanish Revival. The house is privately owned and is currently used as a residence.
Samuel May House	1980	Building #80001526	690 Northlake Dr., Prestonsburg	This structure is significant for Politics and Government as well as Architecture during the period 1800-1849, and is associated with a person of local significance, Samuel May. The architectural style is Federal. The house is privately owned and is currently used as a residence.
May-Fitzpatrick House	1989	Building #89000392 Also known as FD-5	39 S. Arnold Ave., Prestonsburg	This structure is significant for Architecture during the period 1900-1924, and was built in the Queen Anne architectural style. The house is privately owned and is currently used as a residence.

Table 5-10. National Register of Historic Places Listings, Floyd County, Kentucky

Site Name	Date Added	Site ID	Address	Description
May-Latta House	1989	Building - #89000393 Also known as FD-65	33 N. Arnold Ave., Prestonsburg	This structure is significant for Architecture during the period 1900-1924, and was built in the Bungalow/Craftsman architectural style. The house is privately owned and is currently used as a residence.
Methodist Episcopal Church, South	1989	Building #89000391 Also known as Prestonsburg First United Methodist Church; FD-6	S. Arnold Ave. between Ford St. and W. Graham St., Prestonsburg	This religious structure is significant for Architecture during the period 1900-1949, and was built in the Late Gothic Revival architectural style. The structure is privately owned and retains its original function as a Religious Structure.
Middle Creek Battlefield	1992	Site #91001665	3 mi. W of Prestonsburg at jct. of KY 114 and KY 404, Prestonsburg	This Civil War battlefield is significant for both persons and events in the area of Politics, Government and Military during the period 1850-1874. The Battle of Middle Creek was fought in 1862 and is considered a significant Civil War battle, won by the Union Army under Col James A. Garfield.
Town Branch Bridge	1989	Structure #89000396 Also known as FD-71	Co. Rd. 1334 over Levisa Fork, Prestonsburg	This bridge over the Levisa Fork is significant for Community Planning and Development as well as Architecture during the period 1925-1949. The structure was designed by Mac McHenry and built by Steel & Lebby Contracting Company. The structure was replaced in 2004.
US Post Office--Prestonsburg	1989	Building #89000417 Also known as FD-48	Central Ave. and E. Court St., Prestonsburg	Prestonsburg's post office is significant for Architecture during the period 1925-1949. The structure was designed and built by James D. Wetmore and James C. Miller in the Classical Revival style. It is now used as general office space.
West Prestonsburg Bridge	1989	Structure #89000397 Also known as FD-72	Over Levisa Fork between Prestonsburg and West Prestonsburg, Prestonsburg	This bridge over the Levisa Fork is significant for Community Planning and Development as well as Architecture during the period 1925-1949. The structure was designed and built by Steel & Lebby Contracting Company. The structure is owned by local government and is now closed to traffic.
Wheelwright Commercial District	1980	District #80001527	Main St., Wheelwright	This area is significant for Industry, Community Planning and during the period 1900-1949. The district is privately owned and retains its historic functions of Commerce/Trade and Social.
DeRossett-Johns site		Site #94000304, also known as 15D50	Address Restricted, Prestonsburg.	This archaeological site is significant for its information potential. The cultural affiliation is Appalachian Culture during the period 1800-1924. The historic function of the site was a domestic dwelling. The site has been developed into a park by local government.

Table 5-11. Population Projections for Floyd County, Kentucky

Year	Population	Change (%)
1990	43,586	
1995	43,558	- 0.1 %
2000	42,441	- 2.6 %
2005	42,032	- 1.0 %
2010	41,367	-1.6 %
2015	40,402	-2.3 %
2020	39,067	- 3.3 %
2025	37,430	- 4.2 %
2030	35,509	- 5.1%

US U.S. Census Bureau, 1990 and 2000 Decennial U.S. Censuses and 1995 Estimate.
Kentucky State Data Center 2005-2030 Population Projections (Middle Series), August 5, 2003

Within Floyd County, the population of Prestonsburg and Wheelwright increased between 1990 and 2000, while the cities of Allen, Martin, and Wayland had fairly large declines in population. Population changes within the cities of Allen, Martin, Prestonsburg, Wayland and Wheelwright are shown in **Table 5-12**.

Table 5-12. Population Change 1990-2000 for Floyd County and U.S. Census-Designated Places

Place	Study Phase	Population		Change (%)
		1990	**2000**	
Floyd County		43,586	42,441	-2.6%
Prestonsburg	1	3,558	3,612	1.5%
Allen	2	229	150	-34.4%
Martin	3	694	633	-8.8%
Wayland	3	359	298	-17.0%
Wheelwright	3	721	1,042	44.5%
Rest of County		38,025	36,706	-3.5%
Kentucky		3,685,296	4,041,769	9.6%
U.S.		248,709,873	281,421,906	13.2%

US U.S. Census Bureau, 1990 and 2000 Decennial U.S. Censuses

While Floyd County's median age of 36.7 years in 2000 is comparable to surrounding counties, it is slightly higher than the state median of 35.9 years and U.S. median of 35.4. Out-of-county migrations of young people and low natural population increases have contributed to the nearly five-year increase in median age between 1990 and 2000, from 32.1 to 36.7 years. The median age in Allen (40.0 years), Martin (38.3 years), and Prestonsburg (40.7 years) is higher than the Floyd County median. The number of households with members over 65 years of age increased 3.1 percent in the period 1990 - 2000. Female population (51.2 percent) is larger than the male population (48.8 percent). Of the population 16-64 years of age, 35.3 percent are listed as having a disability.

In 2000, Floyd County's population included 10,034 people under 18 years of age, or 23.6 percent of the population. Within the City of Prestonsburg, the percentage of the population under 18 years of age was 20.2 percent, or 730 people.

5.11.2 Race and Ethnicity

With respect to race, Floyd County is a relatively homogenous area. More than 98 percent of the population is recorded as 'White' in both the 1990 and 2000 U.S. Censuses. Within the City of Prestonsburg, 99.3 percent is recorded as "White" in 2000. Population characteristics for the county are shown in **Table 5-13** below.

Table 5-13. 1990 and 2000 Population Characteristics, Floyd County

Characteristic	1990	2000
Population	43,586	42,441
Age		
Under 18 years	28.8 %	23.6 %
65 years and older	11.5 %	12.2 %
Median Age	32.1	36.7
Sex		
Male	48.8 %	48.8 %
Female	51.2 %	51.2 %
Race		
One Race	---	99.6 %
White	99.3 %	97.7 %
Black or African American	0.5 %	1.3 %
American Indian or Alaska Native	0.1 %	0.1 %
Asian	0.1 %	0.2 %
Native Hawaiian or Other Pacific Islander	---	0.1 %
Other	0.0 %	0.1 %
Two or More Races	---	0.4 %
Hispanic or Latino Origin		
Hispanic or Latino of Any Race	0.3 %	0.4 %
Not Hispanic or Latino	99.7 %	99.6 %

US U.S. Census Bureau, 1990 and 2000 Decennial U.S. Censuses

5.11.3 Households

The U.S. U.S. Census Bureau defines a "household" as all the people who occupy a housing unit. A housing unit is a house, apartment, mobile home or trailer, group of rooms, or a single room that is occupied. A household includes the related family members and all the unrelated people, if any, such as lodgers, foster children, wards, or employees who share the housing unit. A family household is defined as a household where persons related by birth, marriage, and adoption reside. A non-family household can consist of individuals living alone or two or more persons living together who are not related by birth, marriage or adoption (U.S. U.S. Census Bureau 2002).

Floyd County had a total of 16,881 households in 2000. The average household size is 2.45 people, and the average family size is 2.93 people. Nearly 36 percent of households in 2000 included individuals under 18 years of age, while more than 23 percent of households included individuals 65 years and older. A little over ten percent of total households are represented by a householder 65 years and over living alone. Family households comprise 72.7 percent of total households. Of the total family households, 77.7 percent are married-couple families and 16.9 percent are female households with no husband present. Percent of family households and married couple households throughout the county are similar to Kentucky and the nation overall. The only exception was the City of Martin where percents were much lower. Within Floyd County, unincorporated areas have higher percentages of family households than incorporated areas. Floyd County household statistics are compared to cities within the county, state, and nationwide statistics in **Table 5-14**.

Table 5-14. Total Number and Average Size of Households in Floyd County, Kentucky and in U.S. Census-Designated Places

Place	Number of Households	Average size Household	Percent Family Households	Percent Married couple Family Households
Floyd County	16,881	2.45	72.7	77.7
Allen	67	2.24	62.7	71.5
Martin	295	2.08	56.6	55.1
Prestonsburg	1,563	2.09	61.2	70.9
Wayland	118	2.53	72.9	76.7
Wheelwright	203	2.53	72.4	74.2
Kentucky	1,590,647	2.47	69.4	77.6
United States	105,480,101	2.59	68.1	75.9

US U.S. Census Bureau, 2000 Decennial U.S. Census

5.11.4 Housing

In 2000, Floyd County had a total of 18,551 housing units, with a nine percent vacancy rate. Prestonsburg had 1,683 housing units, of which 7.1 were percent vacant. Housing stock in Floyd County is growing slightly older. In 1990, 55.0 percent of structures were 20 years old or newer (built since 1970). In 2000, that percentage declined to 42.1

percent (built since 1980). The increase of 3,748 housing units in Floyd County between 1990 and 2000 is partially counterbalanced by the demolition or destruction of 2,366 older residences. The overall population decline during the same period resulted in an increase in vacancy rates, from 9.4 percent to 10.5 percent. Median housing value in Floyd County rose from $48,530 to $53,100 in 2000 dollars during the period 1990-2000. Single-unit detached homes comprise 62.0 percent of the total units, and mobile homes comprise 29.5 percent. Multi-unit structures make up just 8.3 percent of total housing units. Floyd County housing statistics are compared to cities within the County, Kentucky, and the Nation overall in **Table 5-15**.

Table 5-15. Housing Statistics for Floyd County, Kentucky in 2000 and in U.S. Census-Designated Places

Place	Median House Value ($)	Age: 20 years or newer (%)	Mobile Homes (%)
Floyd County	53,100	42.1	29.5
Allen	65,000	33.3	43.9
Martin	44,000	27.6	14.7
Prestonsburg	85,900	20.5	10.0
Wayland	37,800	24.1	19.8
Wheelwright	31,300	20.9	5.2
Kentucky	86,700	36.3	13.3
United States	119,600	32.7	7.0

US U.S. Census Bureau, 2000 Decennial U.S. Census

Median home value within Floyd County as a whole is less than half the overall national median, and about two thirds the Kentucky median value. Median values among cities differ greatly with a range of values from $31,300 in Wheelwright to $85,900 in Prestonsburg. While housing stock has declined in Floyd County since 1990, the percentage of newer homes within the county is slightly above state and nationwide percents. Homes within the cities tend to be older. The percent of mobile homes within the county are much greater than the state or nationwide percents. Cities within Floyd County vary greatly in mobile home percentages ranging from 5.2 percent in Wheelwright to 43.9 percent in Allen. Home ownership was similar in Wheelwright at 76.8 percent to the countywide average of 76.3 percent. The cities of Allen (74.6 percent), Martin (45.4 percent), Prestonsburg (52.8 percent), and Wayland (70.3 percent) were lower than the countywide average.

Local housing providers in Floyd County include Floyd County Housing Authority, Housing Authority of Prestonsburg, Housing Authority of Martin, and Church Housing Association. Thirteen developments - three in Prestonsburg - have a total of 698 units ranging from efficiencies to four-bedrooms. (BSADD 2002).

According to the 2000 U.S. Census, Floyd County vacant housing units totaled 1,670.

5.11.5 Education

Floyd County. Public education is provided by the Floyd County School District. The system contains four high schools, three middle schools, and nine elementary schools (BSADD 2002). Three alternative schools include the Big Sandy Juvenile Detention Center, Opportunities Unlimited, and Carl D. Perkins Job Corp Academy. Total enrollment during the 2002-2003 school year was 6,971students (ThinkKentucky 2003). Three private schools exist within the county including Mountain Christian Academy, Wesley Christian, and the Piarist School. BSCTC and Morehead State University (MSU) – BSCTC Campus are located in Prestonsburg. BSCTC offers a variety of associate degrees, diplomas, and certificate programs. MSU at Prestonsburg offers a variety of bachelor and master's degree programs. An off-campus course site for Sullivan University is located at Big Sandy Community & Technology College. In addition, Floyd County Area Technical Center is located within the City of Martin.

Project Study Phases. Only two schools fall outside of the study area, as shown in **Figure 5-9**. Within Phase 1, there are three public schools, two alternative schools, and two colleges. Five of these facilities are located in the vicinity of proposed floodwalls. They include Prestonsburg High School, Prestonsburg Elementary School, Big Sandy Area Juvenile Detention Center Alternative School, and both colleges.

Prestonsburg High School and BSCTC buildings were identified as buildings likely to be affected by flood events similar in magnitude to the 1977 Floyd flood based on USACE flood event simulations. Prestonsburg High School, with more than 670 students, serves rural and small town secondary students in northern Floyd County

Within Phase 2, there are four public schools and the Wesley Christian School. Phase 3 consists of eight public schools, Opportunities Unlimited Alternative School, Piarist School, Mountain Christian Academy, and the Garth Area Technology Center.

In 2000, 61.3 percent of the Floyd County population over 25 years old had obtained a high school diploma, while 9.7 percent had graduated college with at least a Bachelors degree. While educational rates in the county are less than the statewide average, they represent increases over 1990 high school and college graduation rates of 50.9 percent and 7.4 percent, respectively. High school graduation rates in Allen and Wheelwright are similar to county rates. Prestonsburg and Wayland have slightly higher rates, while Martin has a slightly lower rate. Percentage of individuals with at least a Bachelors degree is much higher in the cities of Allen and Prestonsburg, whereas Wayland and Wheelwright are a much lower than county rate. Countywide and statewide educational rates are below nationwide rates. Percent of individuals within the cities of Allen, Martin, Prestonsburg, Wayland and Wheelwright who graduated from high school or obtained at least a Bachelor's degree are shown in **Table 5-16**.

Table 5-16. Educational Attainment

Place	High School Diploma (%)	Bachelors Degree or greater (%)
Floyd County	61.3	9.7
Allen	61.8	13.5
Martin	58.5	9.9
Prestonsburg	64.7	17.5
Wayland	67.9	3.6
Wheelwright	60.8	3.8
Kentucky	74.1	17.2
United States	80.4	24.4

US U.S. Census Bureau, 2000 Decennial U.S. Census

5.11.6 Local Economy, Employment and Labor Force

Floyd County's local employment base has historically focused on natural resource extraction, including coal mining and timbering. While mining and forestry companies are still significant employers, the economy has diversified and resource extraction is no longer the largest employment sector. Educational, health and social services employed 3,001 persons, or 23.9 percent of the labor force, making it the largest employment sector. Retail trade is second with 15.0 percent of workers. The combination of agricultural support, fishing, forestry, hunting and mining was the third largest sector, with 1,321 workers (10.5 percent of employment in the county). Agriculture-related employment represented less than one percent of the labor force of Floyd County in 2001 (U.S. Department of Labor, Bureau of Labor Statistics).

Major employers in Floyd County in 2002 are listed in **Table 5-17**. The Floyd County Board of Education and Mountain Comprehensive Care Center buildings were highlighted by USACE flood event simulations as buildings that would be affected by flood events similar in magnitude to the 1977 Floyd flood and 100-year flood event, respectively.

Table 5-17. Major Employers Floyd County 2002

Employer	City	Project Phase Area	No. of Employees
Floyd County Board of Education	Prestonsburg	1	1,113
Highlands Regional Hospital Corp	Auxier	1	411
Mountain Comprehensive Care Center	Prestonsburg	1	331
Action Petroleum Group Ltd	Prestonsburg	1	265
McDowell ARH	McDowell	3	232
Quaker Coal Co Inc	Allen	2	196
Wal-Mart Associates Inc	Prestonsburg	3	195
Our Lady of the Way Hospital	Martin	3	195
Gearheart Communications Inc	Betsy Layne	2	175
Source: BSADD, 2003			

The U.S. U.S. Census Bureau defines an establishment as a single physical location at which business is conducted or services or industrial operations are performed. An establishment is not necessarily a company or enterprise, which may consist of one or more establishments. The U.S. Census Bureau County Business Patterns lists 43 mining industry establishments in Floyd County for 2001 out of 826 total establishments, compared with 173 retail trade establishments and 108 health care and social assistance establishments. Other significant industries include transportation and warehousing (53 establishments); professional, scientific and technical services (65 establishments); other services (70 establishments); wholesale trade (55 establishments); and construction (58 establishments).

The mining industry represented 19.9 percent of Floyd County’s nearly $246 million annual payroll in 2001, with $49 million paid to employees in salaries, wages, bonuses, benefits, and other forms of compensation. Payrolls for health care and social assistance represented 21.9 percent of total annual payroll, while retail trade was third with 10.5 percent.

In Floyd County, 41.4 percent of the total population over 16 years of age is considered part of the county’s labor force. This value is much lower than the statewide rate of 60.9 percent. Surrounding counties have similar values.

The adjacent counties and all other major commuting counties define a county’s labor market area. **Figure 5-10** shows the labor market area for Floyd County. In 2000, Floyd County drew 3,335 employees from other counties within the labor market area, but had a negative net workflow. **Table 5-18** shows Floyd County and the Labor Market Area civilian labor force and unemployment rates for 2002 and for September 2003. (ThinkKentucky, 2003).

Table 5-18. Civilian Labor Force

Category	Prestonsburg 2000	Floyd County		Labor Market Area	
		2002	Dec. 2003	2002	Dec. 2003
Civilian Labor Force	1,211	13,695	13,938	77,941	77,399
Employed	1,087	12,813	12,970	72,612	72,288
Unemployed	124	882	968	5,329	5,111
Unemployment Rate (%)	10.2	6.4	6.9	6.8	6.6
Source: US U.S. Census Bureau, 2000 Decennial U.S. Census; U.S. Department of Labor, Bureau of Labor Statistics, from ThinkKentucky 2003					

5.11.7 Income and Earning

As part of the Appalachian Region, Floyd County and its Labor Market Area have historically had more economic challenges than other parts of Kentucky and the Nation. Although Floyd County's median household and per capita incomes increased between 1990 and 2000, they are still lower than statewide levels. In 2002, Floyd County had a per capita income of $12,442, which ranked 70th in the state (out of 120 counties), compared with $18,093 for Kentucky. Median household income in 1999 was $21,168 in Floyd County, compared with $33,672 statewide that ranked 28th in the state (BSADD 2003). Median household income in Allen and Prestonsburg is comparable to county levels. Per capita income is comparable to state levels in Prestonsburg and to county levels in Allen City. The cities of Martin, Wayland, and Wheelwright have significantly lower median household incomes and per capita incomes compared with Floyd County overall. Income levels within the cities of Allen, Martin, Prestonsburg, Wayland and Wheelwright are shown in **Table 5-19**. Poverty rates in Floyd County decreased slightly from 1990 to 2000, but are still well above statewide rates. In 1990, 26.9 percent of individuals had income below poverty levels, and in 1999 26.9 percent of families in Floyd County and 26.3 of families in Prestonsburg were considered below the poverty level.

Table 5-19. Median Household Income and Per Capita Income

Place	Median Household Income ($)	Per capita Income ($)
Floyd County	21,168	12,442
Allen	20,625	12,720
Martin	12,917	10,773
Prestonsburg	20,810	18,013
Wayland	14,688	7,886
Wheelwright	14,808	5,367
Kentucky	33,672	18,093
United States	41,994	21,587
US U.S. Census Bureau, 2000 Decennial U.S. Census		

5.11.8 Community Services

Floyd County has 14 licensed child day care centers with a total capacity of 566 children, including after school and Head Start programs. Of the 566 spaces, 199 of the spaces are within Prestonsburg (BSADD 2003). Five home-certified day care facilities provide services in the county.

The Floyd County Public Library has one branch located in Prestonsburg. The library can also be accessed online at http://www.fclib.org. Additional library resources can be found at BSCTC Library and at individual schools.

Floyd County has seven senior citizen centers offering programs for area seniors. Centers are located in Betsy Layne, Martin, McDowell, Grehel, Prestonsburg, Wayland, and Wheelwright. The Wayland Senior Citizens Center and Happy Adult Day Care provide center based respite services. Senior nutrition services are also provided through the seven centers. The BSADD is the designated Area Agency on Aging (BSADD 2003).

The Floyd County Health Department provides services throughout the county. Floyd County has four nursing homes, three in Prestonsburg and one in McDowell. The BSADD considers the region to have “strong mental health and counseling services” (BSADD, 2002).

5.11.9 Community Cohesion

Community Cohesion is defined as a sense of shared values and purpose, and a tolerance and acceptance of other residents. How cohesive a particular community is can be assessed from learning about the education, religion, land tenure, organization membership status, family distribution, income/wealth, and social behavior of residents.

Numerous small neighborhoods or villages are located outside of the incorporated municipalities of Prestonsburg, Allen, Martin, Wayland, and Wheelwright. They generally occur in the floodplains of the major waterways where there is enough flat land to build multiple homes. The neighborhoods tend to be linear, found along secondary and side roads in hollows throughout the county. Cohesion between these linear communities can be limited by topography, distance, and spatial barriers.

A survey of residents was conducted to evaluate community cohesion and social impacts of the identified flood protection alternatives in Floyd County. The project area includes structures within the Phase 1 project area. Surveys were primarily conducted along the Levisa Fork and not along the many tributaries. Residential (single-family homes, apartments, etc.) and nonresidential (commercial, stores, offices, etc.) surveys were completed in Prestonsburg, Auxier, and East Point. Additional residential surveys were completed in the communities of Beaver Bottom, Draffin, Garden Village, Justiceville, Mossy Bottom, and Regina. Additional detail can be found in the study, included as **Annex D**.

Measurement of community cohesion is relatively difficult to ascertain and not very precise because it is an intangible concept. However, several factors which are measurable lend themselves to the inference of a community's cohesiveness. These factors are measurable based upon survey results or socio-economic data. Among nonresidential areas, these factors are term of occupancy of structure; repeat customers, reliance on adjacent support businesses, turnover rate, rate of owner-occupancy; relocation preferences; and special characteristics of the neighborhood. For residential areas, these factors are:

- **Term of occupancy of structure.** Longer tenure tends to increase community cohesion - neighborhoods and commercial areas are more stable.
- **Frequency of visits with friends and family**. The more connections and contacts residents have in an area, the more likely they are to remain in the area, even if required to relocate. The frequency of visits may also have some effect on participation in floodproofing programs.
- **Number of families with children**. The presence of children in the household typically promotes community cohesion through the involvement of parents in school activities, sports, church and community groups.
- **Rate of owner-occupancy.** Ownership typically indicates that residents and owner/operators are engaged in their community and value the area enough to purchase property. This connection to the area also confirms a high level of community cohesion. Property owners have a vested interest in what happens in the community.
- **Employment status and location or employment.** Employment status is important in considering community cohesion because community ties are typically stronger when a person is employed, especially employed in the area. The workplace can be a place of socializing as well as lead to other social activities. Retirees also tend to socialize more with other retirees and often with other retirees of the same industry or employer because they have common bonds.
- **Relocation preferences**. Residents and owner/operators want to stay close to friends and family, whom they visit frequently, want to maintain schools for their children, want to remain in a safe and peaceful neighborhood, and want to maintain their businesses.
- **Special characteristics of the neighborhood** (as defined by the person taking the survey).

Existing community cohesion was evaluated for the Phase 1 nonstructural and Prestonsburg areas. Additional detail can be found in the study (**Annex D)**.

- **Floyd County Nonstructural Phase I Study Area.** The study survey found that although geographically dispersed along the Levisa Fork River, community cohesion of the nonstructural areas within DPR1 is moderate. The high average term of occupancy indicates a high level of community cohesion. Residential survey respondents reported visiting 3.6 times per week, which equates to a moderate level of community cohesion. The majority of respondents currently own the structure where they reside or operate their business. Owner-occupancy among the nonresidential respondents is 68.4 percent and among the residential respondents it was higher at a rate of 77.0 percent. Survey results show that 85.2 percent of respondents are employed, retired, or disabled. If required to relocate, 88.4 percent of nonstructural survey respondents indicated they would prefer to stay in their current community/neighborhood or within Floyd County. Residents and owner/operators want to stay close to friends and family, whom they visit frequently, want to maintain schools for their children, want to remain in a safe and peaceful neighborhood, and want to maintain their businesses. Special characteristics of the neighborhood noted were that friends, family or customers made the neighborhood or location special, that their home or heritage was important, that the area was a good place to raise children, and that a sense of community made the neighborhood special. The number of families with children at home was not specifically asked in the survey, but the study inferred that 31.7 percent of households were families with children present, compared to the 2000 U.S. Census Data indicating 33.0 percent of Floyd County households consisted of families with children present.

- **Prestonsburg Area.** Overall community cohesion of the Prestonsburg structural area is high. The average term of occupancy for all Prestonsburg structural area respondents is 20.3 years. The high average term of occupancy indicates a high level of community cohesion. Residential survey respondents reported visiting 3.7 times per week, which equates to a moderate level of community cohesion. The number of families with children at home was not specifically asked in the survey, but the study inferred that 26.7 percent of households were families with children present, and community cohesion based upon number of families with children is considered to be moderate. The majority of respondents currently own the structure where they reside or operate their business. Owner-occupancy among the nonresidential respondents is 67.3 percent and among the residential respondents it was higher at a rate of 79.4 percent. This connection to the area also confirms a high level of community cohesion. Consideration of the employment criterion indicates a high level of community cohesion. If required to relocate, 86.0 percent of respondents – and 91.5 percent of those in downtown Prestonsburg – indicated they would like to remain in their current neighborhood or within Floyd County. This high rate indicates a very high level of community cohesion. Special characteristics of the neighborhood noted were that friends, family or customers made the neighborhood or location special, that their home or heritage was special, and that a sense of community made the neighborhood special.

5.12 Recreation

Recreational opportunities available for Floyd County residents include both local and regional resources. Six county parks offer a variety of recreation facilities throughout the county, including children's playgrounds, baseball fields, walking tracks, basketball and tennis courts, picnic areas, swimming pools, a skating rink, and river access points. Major points of interest within the county include the Mountain Arts Center, East Kentucky Science Center, and Jenny Wiley State Resort Park. The Mountain Art Center located within Prestonsburg offers both education and entertainment value via a conference meeting room, an arts and crafts shop, an audio studio recording device, and a 1,050 seat auditorium. The East Kentucky Science Center opened in 2003 and provides a planetarium, classrooms, special traveling exhibits, and a gift shop. Jenny Wiley State Resort Park contains Dewey Lake, hiking trails, and a theatre that offers Broadway shows each year. Stone Crest and Beaver Valley Golf courses are in the cities of Prestonsburg and Allen, respectively.

As is common in eastern Kentucky, Floyd County has numerous scenic viewsheds, wildlife habitat, and natural forestland. The Jefferson National Forest is located in the southern portion of Pike County, which borders Floyd County to the east. Additional wildlife management areas within 50 miles of Floyd County include Fishtrap Lake, Paintsville Lake, Addington Enterprises, Grayson Lake State Park, Yatesville Lake State Park, Carr Creek State Park, Pine Mountain Trail State Park, Breaks Interstate Park, and Laurel Lake Wildlife Management. Overall, hunting, fishing, camping, hiking, boating, golf, lodging, and cultural arts are offered through these resources.

The lower Levisa Fork and its tributaries (Johns Creek, Beaver Creek, and Middle Creek) are considered Class 3 Rivers with respect to fish resources. The lower Levisa Fork is also considered a Class 2 River for flatwater boating (KY Rivers Assessment, 1992).

Parks or recreation areas located within the vicinity of the proposed floodwall in Prestonsburg include:

- Archer Park – This municipal park is across the Levisa Fork from Prestonsburg and encompasses 32 acres. Facilities include tennis courts, swimming pools, ball fields, roller skating, kiddie park, lighted outdoor basketball court, indoor basketball court and picnic shelters.
- Prestonsburg High School - Athletic facilities, including football field and indoor gymnasiums are available.
- BSCTC - It offers nature & walking trails and a wellness center composed of aerobic machines & weight training.
- Levisa Fork River Park – The park has a boat ramp, a picnic shelter and an outdoor stage in downtown Prestonsburg.
- Memorial Park – An outside basketball area is located in the parking lot behind the Community United Methodist Church.

5.13 Hazardous, Toxic and Radioactive Waste

5.13.1 Regulatory Framework

In general, hazardous materials/wastes are defined as any solid, liquid, contained gaseous, or semi-solid material/waste, or any combination of materials/wastes, which pose either a substantial present or potential hazard to human health or the environment, as determined by ignitable, corrosive, reactive, or toxic characteristics. Several laws and regulations set forth specific definitions for hazardous materials/wastes. For this document, a hazardous material/waste is any one of the following:

- Any substance designated pursuant to Section 311(b)(2)(A) of the CWA
- Any element, compound, mixture, solution, or substance designated pursuant to Section 102 of the CERCLA of 1980
- Any hazardous waste having the characteristics identified under the Resource Conservation and Recovery Act (RCRA)
- Any toxic pollutant listed under Toxic Substance Control Act (TSCA) of 1976
- Any hazardous air pollutant listed under Section 122 of the CAA
- Any imminently hazardous chemical substance or mixture with respect to which the USEPA Administrator has taken action pursuant to Subsection 7 of TSCA

CERCLA and RCRA are the primary regulations that govern hazardous substance use, handling, and remediation. In general terms:

- CERCLA - Regulates the cleanup of releases, or threats of releases, of hazardous substances, pollutants, and contaminants
- RCRA - Regulates the management of hazardous waste, including storage, handling, transportation, treatment, and disposal

Hazardous, Toxic, and Radioactive Waste (HTRW) investigations are performed to identify potentially contaminated properties. The Phase I HTRW investigation utilizes existing information in conjunction with visual assessment of the properties to determine whether additional investigations area needed. Phase II(a) HTRW investigations are performed on those properties identified for further evaluation in the Phase I. The Phase II(a) HTRW investigation consists of physical sampling and analysis techniques for hazardous substances regulated under the CERCLA. Any confirmed HTRW contamination discovered on a subject property is the responsibility of the local sponsor and/or landowner. Additionally, contaminated properties subject to remediation activities must be remediated before construction activities commence or before the USACE purchases property on behalf of the sponsor.

5.13.2 Existing Conditions

The predominant commercial/industrial land uses in Floyd County are coal mining, and logging. No chemical or petroleum industries are located in the county. Visual site surveys within the area noted gasoline service stations, automobile repair shops, construction shops, and a petroleum lubricants tank storage facility (USACE 2003). A summary of the major industries in the Floyd County, Kentucky area is provided in **Table 5-20**.

Table 5-20. Major Manufacturers in the Floyd County, Kentucky Area

Firm	Project Phase	Product(s)	Employment	Year Established
Prestonsburg (Phase 1)				
Faith Signs & Awnings Co/Action Outdoor	1	Vinyl, plastic, painted, metal & magnetic signs; fabric awnings	21	1993
Floyd County Newspapers Inc	1	Newspaper & shopping guide publishing & offset printing	48	1927
Jim C Hamer Co	1	Sawmill	27	1999
Jim C Hamer	1	Metals service center: steel cutting, slitting, shearing & drain pipes	26	1938
Republic Diesel	1	Automotive & truck driveshafts	7	1911
Allen (Phase 2)				
May Block & Concrete Products Co.	2	Concrete block & products	10	1945
Ivel (Phase 2)				
R & S Godwin Truck Body Co LLC	2	Steel & aluminum fabricating: dump truck bodies & trailers	119	1968
Unisign Corp	2	Metal, painted, plastic, electrical & wooden signs; billboard advertising	10	1989
Martin (Phase 3)				
Frasure Manufacturing & Electrical Services	3	Electrical coal mining equipment, battery chargers & beltline starters	5	1978
Shirt Gallery	3	Fabric screen printing, embroidery	12	1984
Source: Kentucky Cabinet for Economic Development (3/31/2004)				

The number of sites with potential HTRW issues increase in the more populous areas including the City of Prestonsburg, the Auxier community, Middle Creek, and Bull Creek in areas adjacent to Prestonsburg.

The USACE conducted a Phase I HTRW investigation within the construction work limits of the proposed Prestonsburg structural areas in January 2005. The purpose of the investigation was to identify recognized environmental conditions and the potential presence of HTRW contaminants in these areas. The Phase I HTRW report is included as **Annex E**.

The field investigation noted no HTRW concerns that would impact the proposed floodwall alignment construction and operation. Four transformers on power poles were noted, as well as a natural gas line/well near Access Drive. No signs of contamination or leakage were noted by investigators. Regulatory records indicated one underground storage tank (UST) was removed at the college in 1995 with clean closure.

A closed UST was identified within one block of the intersection of Music Street and Arnold Avenue. Regulatory records indicated that the UST was closed in place, satisfying exemption by the Kentucky Department of Environmental Protection's (KYDEP) UST Branch regulations at that time. The KYDEP indicated in a February 17, 1997 letter that the UST was exempt from regulation, but would be subject to KYDEP Superfund Branch regulations regarding tank closure. A clean closure from the KYDEP Superfund Branch has not yet been given because the property owner has not performed confirmation sampling around the tank following closure.

No utility surveys or HTRW investigations have been conducted on the three borrow areas. During a site visit, gas line markers were detected in the Granny Fitz borrow area Investigations will be conducted prior to final selection of a borrow area .

5.14 Health and Safety

Health care in Floyd County is provided by three hospitals, fourteen medical clinics, and four nursing facilities. Three of the six major hospitals in the Big Sandy River district are located in Floyd County, including McDowell Regional Appalachian Hospital, Our Lady of the Way Hospital, and Highlands Regional Medical Center. They provide approximately 275 total beds. In 2003, Floyd County had 77 licensed doctors and 37 dentists (BSADD 2003).

The majority of the health care facilities are located within the nonstructural phase areas of the project as shown in **Figure 5-11**. Several clinics and care centers are located within the area that would be protected by structural measures in Alternative Plans 2 or 3. These include the Archer Clinic, Mountain Comprehensive Care Center, Big Sandy Health Care, Bma Dialysis, and the Layne House Substance Abuse Treatment Program. Several doctors offices and mental health providers are located with the area that would be protected. Some of these buildings would be affected by a 100-year flood event based on USACE flood event simulations.

The Prestonsburg Fire Department serves the Prestonsburg area and is located within the vicinity of the proposed floodwall (BSADD 2002).

Floyd County has a variety of environmental problems. Water sources are affected by failing septic systems and straight pipes. Open dumps have damaged scenic views in the area as well as potentially contaminating soil and water. The contamination of water and soils are associated with the spread of many communicable diseases, and are a health concern in the area (BSADD 2002).

Fire protection in Floyd County is provided by at least 13 fire departments, mostly volunteer. In addition to the fire departments, four emergency medical service (EMS) providers are located in Floyd County. The Prestonsburg Fire Department serves the Prestonsburg area (BSADD 2002).

5.15 Infrastructure

5.15.1 Telecommunications

BellSouth Telecommunications, Inc., Gearheart Communications Company, Inc., and Thacher-Grigsby Telephone Company, Inc. provide local telephone services in Floyd County. Additional companies provide long-distance and cellular services within the county. Cellular coverage outside of major travel corridors is often poor or nonexistent due to the mountainous terrain (BSADD 2002).

Broadband connections are available in some areas of Floyd County. Public access to technology and internet services is provided by Floyd County Public Library, Community Action Program, BSCTC, David School, Department of Employment Services, Mountain Arts Center, Cliffside Community Learning Center, and Carl D. Perkins Job Corps Center (BSADD 2002).

Television cable services are provided by Cable Vision Communications in Prestonsburg and Tel Com Inc. in Harold.

5.15.2 Electricity

Electricity in Floyd County is provided by American Electric Power (AEP) and two rural electric cooperative corporations (RECC), which include Big Sandy RECC and East Kentucky Power Cooperative, Inc. Electricity service is generally reliable.

5.15.3 Natural Gas

Floyd County has several natural gas providers, including Auxier Gas Company, Inc., B & H Gas Company, Columbia Gas of Kentucky, Inc., Cow Creek Gas, Inc., Eastern American Energy Corporation, Equitable Gas Company, Martin Gas, Inc., Mike Little Gas Company, Inc., Prestonsburg City Utilities, Prestonsburg Housing Authority, Slick Rock Gas Company, and Wheelwright Utility Commission. Natural gas service is generally reliable.

5.15.4 Water

Drinking water in Floyd County is provided by four major public water systems (Prestonsburg Utilities Commission, Wheelwright Utilities Commission, Southern Water and Sewer, and Francis Water Company). Services are also provided by water purchased from Prestonsburg Utilities Commission. In addition to these major water systems, Floyd County has three community water systems and two non-community systems. Water sources for the above facilities include both surface water (Levisa Fork, Left Fork Big Sandy, and Dewey Lake) and groundwater sources. Approximately 68 percent of Floyd County households, or about 16,700 persons, obtained drinking water through public water systems in 1999. Public water systems in Floyd County are shown in **Table 5-21.**

Table 5-21. Floyd County Public Water Systems

System/ Service Area	Population Served (individuals)	Water Source	Treatment Plant Capacity (gallons per day)	Daily Average Production (% of capacity)	Storage Plant Capacity (gallons)
Auxier Water Company/ northern Floyd County	2,021	Purchased from Prestonsburg City Utilities	n/a	n/a	50,000
Francis Water Company/ Community of Garrett	530	Groundwater from abandoned mine	84,100	n/a	n/a
Martin Water Department/ Martin	1,003	Purchased from Prestonsburg City Utilities at mouth of Buck's Branch on KY Route 80	n/a	n/a	210,000
Prestonsburg City Utilities Commission/ Prestonsburg	12,392	Left Fork Big Sandy	5,000,000	60	3,054,800
Sandy Valley Water District	4,711	Purchased from Prestonsburg City Utilities	5,000	n/a	300,000
Southern Water and Sewer District/ southern Floyd County	10,239	Levisa Fork	2,000,000	53.5	n/a
Wheelwright Utilities Commission/ Wheelwright	871	Wheelwright Mine	350,000	48.6	200,000
Corps of Engrs/ Dewey Lake	80	Dewey Lake	40,000	n/a	n/a
Camp Shawnee	25	Dewey Lake	34,560	n/a	n/a

Source: WRDC, 2003
n/a not available

About 14,000 people in the county rely on other water sources for drinking water. Approximately 13,000 people use wells and 1,000 use cisterns, hauled water, or other sources (Water Resources Development Commission (WRDC)).

Water management projections provided by the BSADD indicate that water supply from the four major water suppliers will rise to 6.9 mgd by 2015, a 42 percent rise from the 4.9 mgd used in 2000. The majority of the increase will be used to provide reliable and safe water service to existing residents. An estimated 87 percent of Floyd County's project 2020 population will have public water supply access. Floyd County had a total of 385 miles of water lines in 1999. An additional 180 miles of service lines are planned.

5.15.5 Wastewater

Sewer service in Floyd County is much less extensive than water service and is provided by three major entities: City of Martin, Prestonsburg City Utilities, and Wheelwright Utilities Commission. Approximately 5,570 people, or 13 percent of the population, receive sewer service. The majority of individuals in the area rely on septic systems and straight pipes. The BSADD estimated in 2001 that Floyd County has an estimated 1,925 failing septic systems and 1,118 straight pipes.

The City of Martin's wastewater treatment plant, a municipality owned oxidation ditch facility, serves approximately 600 people. This 0.114 mgd secondary level wastewater treatment plant discharges into Beaver Creek.

Prestonsburg City Utilities Commission serves Prestonsburg and its surrounding areas. Approximately 4,000 people within Floyd County are served by this 1.0 mgd secondary level wastewater treatment plant. Serious problems with combined sewer overflow and odor problems at the site have ensued. Plans are underway to address the combined sewer overflow problem by separating the storm water from sanitary sewers.

Wheelwright Utilities Commission's wastewater treatment plant serves approximately 770 individuals. The plant was designed to treat a flow of 0.225 mgd at secondary level of treatment. The plant, an extended aeration facility, discharges effluent into Right Otter Creek, a tributary of the Big Sandy River. The plant continues to have problems with system overflows due to flooding that result in untreated releases into nearby creek.

There are approximately 30 proposed sewer or treatment plant related projects within Floyd County based on the 20-year regional planning guide. Total estimated cost for all these projects is approximately $54 million. The majority of the projects are for increased sewage collection services or treatment plant upgrades. The proposed Prestonsburg water treatment plant is ranked 10th out of over 400 projects for importance. The project entails sewer line extension and pretreatment plant removals along US 23 South to the county line. The Floyd County Fiscal Court signed an agreement on December 22, 2005 with the City of Pikeville, the Sandy Valley Water District and the Southern Water and Sewer District to implement the project. Funding will come from various sources, including community development block grants, coal severance tax money, the Appalachian Regional Commission, and the Kentucky Industrial Development Authority (Music, 2005).

5.15.6 Solid Waste

The Kentucky Division of Waste Management, Solid Waste Branch utilizes Title 401, KAR Chapters 45, 47 and 48 to regulate landfill permitting and operations for solid and special wastes.

Floyd County has a mandatory solid waste collection program. However, the program meets only three of the six requirements for the Kentucky Certified Clean Counties Program administered by Kentucky Division of Waste Management. The requirements met include resident participation in door to door collection, employment of a solid waste coordinator, and assessment/collection of service fees. Floyd County has not met the requirements pertaining to cleaning up open dumps, the formation of a clean county committee, or legal actions against delinquent customers.

Collection services provided by Waste Management and Floyd County Solid Waste transfer 26,000 tons annually to a landfill. Laurel Ridge landfill, operated by Waste Management of Kentucky, LLC, is permitted to operate for an additional 14 years. Adequate landfill capacity is present within the region, with seven landfills within the BSADD. The City of Prestonsburg also offers a solid waste recycling program.

5.15.7 Transportation

5.15.7.1 Roadway

Floyd County is served by US and state routes, as well as county and local roads. The current roadway system within Floyd County consists mainly of two-lane or single-lane, paved, gravel or dirt roads. Local roads are characterized by sharp curves and steep grades, and tend to lack guardrails and other roadway vehicle-protective devices.

Traffic volumes are relatively low on area roads. However, the coal and timbering industries generally place high demand on roadways within Floyd County and the region making maintenance of them difficult. The percentage of coal moving out of the area by truck (rather than rail) increased approximately 11 percent between 1990 and 2000. Trucks carry more than 50 percent of all coal mined in the area.

US 23 – US 23 is a four-lane roadway classified as a rural principal arterial[19] that connects the major communities of Ashland, Paintsville, Prestonsburg, and Pikeville. Average daily traffic (ADT) volume on US 23 within Floyd County ranges from approximately 15,000 to 26,500 vehicles per day, depending on location (Kentucky Transportation Cabinet [KYTC], 2005). This traffic volume would indicate a high level of service on US 23 within Floyd County.

Level of Service is a measure of the quality and quantity of transportation service provided. For roadway systems, it is a qualitative rating of the roadway’s effectiveness in serving traffic, in terms of operating conditions. A rating of traffic flow ranging from A (excellent) through F (heavily congested) compares traffic volume with the maximum

[19] Functional classification groups streets and highways are grouped according to the character of traffic service provided. The three roadway functional classifications are arterial, collector, and local roads. Roadways are grouped into one of these classes, depending on the kind of traffic (local or long distance) and the degree of land access. Arterial: the highest level of service at the greatest speed for the longest uninterrupted distance, with some access control. Collector: less developed level of service at lower speed for shorter distances – collecting traffic from local roads and connecting to arterials. Local: all roads not defined as arterials or collectors – providing access to land with little or no through movement.

capacity of a given intersection or road. **Table 5-22** shows the general relationship of level of service to traffic volumes. However, traffic volume can vary widely during a given 24-hour period, so that peak travel times can be congested even when daily volumes indicate adequate capacity.

Table 5-22. Maximum Traffic Volumes (Passenger Cars Per Hour Per Lane) Per Level of Service

ROADWAY TYPE	LEVEL OF SERVICE				
	A	B	C	D	E
4-lane Freeway	700	1,100	1,550	1,850	2,000
2-lane Highway	210	375	600	900	1,400
4-lane Highway	720	1,200	1,650	1,940	2,200

Source: Rodrigue, 2006

Recently, the section of US 23 between Paintsville and Prestonsburg was completed. Within Floyd County, planning is underway for a connector road between the communities of Minnie and Harold. No continuous four-lane highway provides east-west access.

I-66 – A new interstate connection, the Southern Kentucky Corridor (I-66) is in the design process and should be beneficial to the entire Big Sandy region when completed. The interstate will connect Pikeville to the proposed King Coal Highway to the northeast and to Somerset, Kentucky to the west.

State Routes – Several state routes are within the structural study area. **KY 114** is a two-lane east-west rural principal arterial that extends from the Magoffin County line in the west to Prestonsburg. The US 23/KY 114 interchange is the major entryway to Prestonsburg. Both the Spurlock Creek Branch and Granny Fitz Branch borrow areas are accessed via KY 114. The ADT for KY 114 ranges between 6,235 vehicles per day near the Magoffin County line to 15,939 vehicles per day across the Levisa Fork to Prestonsburg (KYTC, 2005).

KY 1428 generally follows the eastern side of the Levisa Fork and is known as Lake Drive within Prestonsburg. KY 1428 is classified as an urban minor arterial through central Prestonsburg (ADT of 17,362 vehicles per day) and an urban major collector street north of Prestonsburg High School (ADT of 5,625 vehicles per day). KY 1428 terminates at US 23 north of Prestonsburg after crossing the Levisa Fork near the BSCTC (KYTC, 2005).

KY 321 splits off KY 1428 in Prestonsburg at Prestonsburg High School and continues north of the city approximately three miles to terminate at KY 3. KY 321 provides access to potential borrow area PB-1. The ADT within Prestonsburg is 11,171 vehicles per day, decreasing to 6,020 vehicles per day near KY 3 (KYTC, 2005).

5.15.7.2 Rail

CSX Transportation (CSX) (Class 1 carrier) and R.J. Corman Railroad (RJCR)/Bardstown Line (Class 3 carrier) provide freight rail service in Floyd County. Carrier class is based on gross annual revenue. CSX rail lines parallel the Levisa Fork throughout the entire county including the Prestonsburg area where structural measures are under consideration. Rail lines are on the opposite side of the river from proposed floodwall/levee alignments. CSX rail lines also parallel Beaver Creek (i.e. including both the Right and Left Fork), which is one of the major tributaries of the Levisa Fork within Floyd County. RJCR rail lines parallel Middle Creek and Left Fork Middle Creek from Prestonsburg to its endpoint at the county border. No passenger rail service is available in Floyd County or in its vicinity.

5.15.7.3 Airports

Paintsville/Prestonsburg Combs Field Airport is located within Johnson County near the border of Floyd County within close proximity to the Levisa Fork. Big Sandy Regional Airport (9 miles NE of Prestonsburg) and Pike County Airport are also located within neighboring counties. No airport provides commercial use in the area. All three airports are classified as general aviation airports by the FAA and are open to the public. Airport operations are shown in **Table 5-23**.

Tri-State Airport is the closest commercial airport and is located seventy-five miles northwest of Prestonsburg.

Table 5-23. Airport Operational Statistics within the vicinity of Floyd County, Kentucky

Airport Operations	Combs Field Airport	Pike County Airport	Big Sandy Regional
Average Number of Airplanes	20/day	80/week	24/day
Percent Transient General Aviation	54%	48%	64%
Percent Local General Aviation	27%	24%	26%
Percent Air Taxi	17%	21%	11%
Percent Military	2%	7%	2%

FAA April 15, 2004 (Obtained from AirNav, LLC)

5.15.7.4 Public Transportation

No formal rural public transportation system operates county-wide. Sandy Valley Transportation provides senior citizen transportation services, as well as paid non-emergency medical transportation services (BSADD 2002).

5.15.7.5 Bicycle Trails

No county-designated bike trails exist in Floyd County. However, two bike tour trails, utilizing county roadways, cross through Floyd County, including the Kentucky TransAmerican Bike Trail and the Midland Kentucky Tour. Tour trails are not considered in any way guaranteed as safe bicycle routes. They are simply routes (federal, state, and county roads) designated by the Kentucky Transportation Center as being more suitable than other routes when bicycling across the state. The TransAmerican Bike Trail enters the eastern border of Floyd County on KY 1091 and turns onto KY 122 as it crosses through the southern end of the county into Pike County. The Midland Kentucky Tour crosses through the northern region of Floyd County. The trail follows KY 1427 east toward Prestonsburg and shifts north onto KY 302 as it enters Johnson County. Scenic stops along the trail within Floyd County include the City of Prestonsburg, Jenny Wiley State Resort Park, and Dewey Lake Reservoir.

5.16 Future Without Conditions

The without project condition (also called the No Federal Action Alternative) assumes no action by the Federal government to implement any type of comprehensive flood damage reduction program in the Levisa Fork basin in Floyd County. It reflects the continuation of existing economic, social, and environmental conditions and trends in the project area. Inherent with this condition would be federally subsidized flood insurance for eligible property owners through the National Flood Insurance Program and continued enforcement of the local floodplain management ordinances. This condition would result in no expenditure of federal funds to implement a flood damage reduction plan under the Section 202 authority for Floyd County. However, federal expenditures to subsidize the flood insurance program and to assist in flood emergency and recovery operations would continue. In addition, FEMA could implement a post-disaster mitigation project featuring nonstructural measures. It is unlikely but possible for the NRCS to implement one or more small-scale watershed retention projects in the county that could reduce flood damages.

Several persistent conditions limit the potential for future growth and economic development in Floyd County. One of these is recurring damages from major floods. It can be expected that Floyd County residents would continue to be subjected to floods and flood damages similar to what has occurred in previous years. The residential and business district would continue to deteriorate and business owners would be left to cover continually increasing flood losses on an individual basis. Flood insurance now available for floodplain occupants, while providing some economic protection, does not necessarily guarantee the owner the ability to replace what is lost or maintain the same lifestyle following a flood event.

Floyd County’s population has declined steadily since the 1980’s, losing more than 6,000 people between 1980 and 2000 (approximately 13 percent of the population). Persistently high unemployment levels, low wages, and fewer opportunities have especially contributed to the outmigration of persons 25 years of age and younger (Glasmeier, 2006).

Resource extraction, especially coal, has historically been a major industry in Floyd County, and one of the major industries in the Levisa Fork Basin. Substantial areas of the basin have been mined over the years. Coal mining in Floyd County decreased by 36.9 percent from 1990 to 2000. However, mining has increased in recent years in response to increased energy demand. It is reasonably foreseeable that there would be ongoing mining activity during the lifetime of the Floyd County Section 202 project. Some potential exists for a substantial increase in coal production associated with synthetic fuel programs. The Gasification Technologies Council forecasts a five percent annual growth in synthetic fuel production operating plant capacity, citing increased demand for clean electricity from coal; expectations of limits on carbon dioxide emissions; high natural gas and petroleum prices (Childress, 2005).

Should mining activity increase substantially, the City of Prestonsburg could have increased prominence as a center of the mining activity. More infill development would likely occur within central Prestonsburg.

Over the past few decades, the economy has changed from an agricultural and mining base to a service economy. Public services, including health care and education, comprise the largest source of employment. Retail trade is the largest employment sector, with prevalent low wages.

Floyd County residents on average have less education and lower incomes than their counterparts statewide or nationwide. The 2000 U.S. Census data shows the Floyd County percentage of the population with a bachelor’s degree or greater (9.7 percent) is less than half the nationwide average (24.4 percent). At $21,168, median household income in 2000 was just over half the nationwide average of $41,994.

Poverty in Floyd County is more than twice the state average even though they decreased slightly from 1990 to 2000. The 2000 U.S. Census indicates that 30.3 percent of the population and 26.2 percent of families live below the poverty line. Out of the total population, 39.8 percent of those under the age of 18 and 20.5 percent of those 65 and older are living below the poverty line (Parsons Brinkerhoff, 2004). Nearly 32 percent of the population identified themselves as disabled to some degree on the 2000 U.S. Census.

Mining and sporadic reclamation activities have resulted in ongoing pollution of the Levisa Fork and many of its tributaries. The potential effects of continued and/or increased coal mining by the mining industry could be periods of increased surface runoff due to removal of vegetation and release of contaminants, such as acid mine drainage and slurry. This increased and/or contaminated runoff would cumulatively increase creek and floodwater elevations and velocities within the Levisa Fork Basin, and continue to adversely affect water quality. Both of these situations would adversely affect aquatic resources during high and low water events.

The KYTC is responsible for the planning, construction, reconstruction, and maintenance of state roads. A variety of U.S. and State Routes follow the curves of the Levisa Fork and its tributaries within Floyd County’s narrow valleys. The KYTC’s Six Year

Highway Plan: FY 2004-2010 identifies the following projects for Floyd County:

- Six bridge replacement projects (0.1 miles in length). Four of the bridge replacements are in the right of way phase (construction scheduled for 2007 or 2008) and the others are scheduled for right of way acquisitions in 2008 and 2009 (construction 2010). Three of the bridge replacements are in the project area (the bridges near Alvin and Minnie are scheduled for construction in 2007 and the one near Garrett is scheduled for construction in 2009).
- One roadway widening project (2.2 miles in length). The road widening project is near Dotson with right of way acquisitions scheduled for 2009).
- One new roadway (3.8 miles in length). The new roadway project is the Minnie-Harold connector where relocation acquisitions have been completed and construction is scheduled for 2006 and 2007.
- One safety improvement (0.1 miles in length to change a curve and add a turn lane). The safety improvement is located in McDowell with construction scheduled for 2006.

Other than the road widening project, the other projects have either completed any residential/commercial relocations or should only have the possibility of a few/if any relocations. It is reasonably foreseeable that road maintenance activities would be periodically required throughout the lifetime of the project.

CHAPTER 6. ENVIRONMENTAL CONSEQUENCES

6.1 General Overview

This Chapter identifies potential direct and indirect effects of the identified alternatives on each of the issue areas presented in **Chapter 5**, and compares and contrasts potential effects of those alternatives. The potential environmental, cultural, and socioeconomic effects of implementing alternatives are identified, as well as their associated mitigation measures, which, when implemented, would reduce the level of identified impacts to acceptable levels.

6.1.1 Direct Versus Indirect Impacts

The terms *impact* and *effect* are synonymous as used in this DEIS. Impacts may be determined to be beneficial or adverse, and may apply to the full range of natural, aesthetic, historic, cultural, social, and economic resources of Floyd County, Kentucky. The following list defines, and provides examples of, direct and indirect impacts as used in this document:

Direct Impact: A *direct impact* is caused by the Proposed Action and occurs at the same time and place as the Proposed Action.

Indirect Impact: An *indirect impact* is caused by the Proposed Action and occurs later in time or farther removed in distance, but still reasonably foreseeable. Indirect impacts may involve induced changes in the pattern of land use, population density or growth rate, and related effects on air, water, and other natural and social systems.

Application of Direct Versus Indirect Impacts: For direct impacts to occur, a resource must be present in a particular study area. For example, if vegetation resources were disturbed in a particular area, a *direct impact* to wildlife would be the result of displacement from available habitat. This displacement would *indirectly impact* habitat adjacent areas by increasing the wildlife population in those areas.

6.1.2 Short-Term Versus Long-Term Impacts

In addition to indicating whether impacts are direct or indirect, differentiation is made between short- and long-term impacts, where appropriate. In this context, short- and long-term do not refer to any rigid time period and are determined on a case-by-case basis in terms of the anticipated consequences of the Proposed Action.

6.1.3 Cumulative Impacts

As described in **Section 2.0**, the USACE proposes to implement measures to reduce flood damages within the Levisa Fork Basin throughout Floyd County, Kentucky. **Sections 6.1 through 6.14** identify potential direct and indirect, short-term and long-term impacts associated with these proposed measures under each of the four specific alternative plans as identified in **Chapter 4**. **Section 6.15** evaluates the cumulative impact of implementing these alternative plans combined with known existing, potential, or anticipated impacts associated with other local or regional activities currently being undertaken or anticipated by other landowners and decision-making authorities.

6.1.4 Significance Criteria

Each resource area impact analysis identifies the relative magnitude of potential impacts of each project component. An impact of a proposed project component is considered significant, whether positive or negative, in cases where the action would result in impacts that are particularly large in magnitude, considering both context and intensity. An impact of an action is considered less than significant in cases where the action would result in impacts that are of smaller scale.

Significant adverse impacts are divided into two categories according to whether or not the impacts could be adequately reduced to less-than-significant levels with the implementation of mitigation measures set forth in this EIS. Potential significant adverse impacts that could be mitigated to less-than-significant levels through mitigation are identified as significant but mitigatable. Potential significant adverse impacts that cannot be mitigated to less-than-significant levels are identified simply as significant adverse impacts.

The term "significance” as used in NEPA requires consideration of both the context and *intensity* of the impact or effect. Significance can vary in relation to the context of the Proposed Action. For this Proposed Action, context may include consideration of effects on a national, regional, and/or local basis. Both short- and long-term effects may be relevant. Impacts are also evaluated in terms of their intensity or severity. Factors contributing to the intensity of an impact include:

- The degree to which the action affects public health or safety
- The proximity of the action to resources that are legally protected by various statutes, such as wetlands; resources listed in, or eligible for, the NRHP; regulatory floodplains; and federally listed threatened or endangered species
- The degree to which the effects of the action on the quality of human environment are likely to be highly uncertain or controversial
- Whether or not the action is related to other actions with individually insignificant but cumulatively significant impacts
- Whether or not the action threatens to violate federal, state, or local law imposed for the protection of the environment.

6.1.5 Mitigation

Mitigation measures are discussed for each alternative, as appropriate. Where significant adverse impacts are identified, this document describes measures that could be used to mitigate these effects to acceptable levels, where possible. Mitigation measures generally include:

- Avoiding the impact altogether by stopping or modifying the Proposed Action
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action, such as implementation of appropriate and accepted Best Management Practices (BMPs)
- Compensating for the impact by replacing or providing substitute resources or environments.

Mitigation of adverse impacts associated with implementing the proposed action is generally the responsibility of the USACE. A summary of mitigation commitments is included in **Section 4.7.1** of this DEIS. Mitigation measures taken to reduce or avoid the selected alternative's adverse environmental effects will be included in the FEIS that will be prepared after the completion of the public review and comment period for the DEIS. Only those mitigation measures that are practicable (i.e., can be accomplished as part of the primary action) have been identified.

6.2 Land Use

6.2.1 Impact Analysis Methodology

Impacts on land use were assessed based on whether or not project activities would be consistent with state and local plans, and on whether or not land uses would be compatible with the project area and uses in the surrounding area. Localized and temporary impacts on land use during construction were also evaluated.

Methods for assessing potential land use impacts generally include analyzing each Proposed Action's potential, due to its location or associated activities, to:

- Impact surrounding land uses directly through increased noise, placement of land use restrictions, or other means, or indirectly through fostering increased development or other changes in areas adjacent to the project
- Impact local aesthetic and visual resources in a way that would alter their visual significance
- Conflict with applicable local or regional land use management plans
- Conflict with local zoning ordinances

6.2.2 Significance Criteria

Evaluation of potential impacts on land use was based on the project's potential to conflict with existing or planned land uses in and around the project areas. Short- or long-term changes in ambient conditions, such as noise, views, and dust, may indirectly affect land use and recreation quality in the project area. Impacts were identified from noise, air quality, and health and safety. Such issues are evaluated in detail, including impacts and associated mitigation, and are presented in their respective sections of this document. In general, an action is considered to have a significant adverse land use impact if the Proposed Action would result in any impact described in **Sections 6.2.3** through **6.2.5**.

6.2.2.1 Incompatible Land Use Impacts

Significant incompatible land use impacts would result if the action/use contained or fostered activities that were considered incompatible with existing land uses. Other significant incompatible land use impacts could occur if an action would:

- Increase pedestrian or visual access enough to reduce privacy within adjacent areas
- Limit public access through the proposed land use to another public use
- Create activities that produce substantial dust, particulates, or odors
- Create a high noise level that would disturb off-site land uses
- Create a potentially unsafe situation as a result of unsafe activities, such as traffic/pedestrian conflicts or hazardous substances

6.2.2.2 Plan Consistency Land Use Impacts

Plan consistency land use impacts would result if an action/use is inconsistent with applicable local or regional land use management plans, including Watershed Conservation Plans, Forest/Wildlife Management Plans for State Game Lands, or local zoning ordinances. These inconsistencies would be considered significant if the Proposed Action would cause nonattainment of relevant management goals, objectives, plans, or land use policies. A proposed land use that is inconsistent but does not prevent attainment is considered less than significant. Proposed actions that collectively and indirectly foster adjacent land use changes (e.g., through increased growth and development) that conflict with current land use plans and zoning would constitute a significant land use impact.

6.2.2.3 Inappropriate Commitment of Land Resources Impacts

In certain situations, the long-term commitment of public lands for specific land uses may be considered a land use impact if it results in the inappropriate commitment of land to a use that is inconsistent with public policy. For example, if an action would place restrictions on public land uses, while not directly modifying the land, this would be considered an inappropriate commitment of land resources. If the proposed land use does not recognize important site resources and prevents the use of these resources for an extended period of time, then the land use would be considered inappropriate. A significant impact regarding appropriate commitment of land resources would occur if one of the following criteria were met:

- Proposed land use is inconsistent with general public policy relative to public access and facilities
- Proposed land use does not recognize or relate to important adjacent resources, such as waterfront, natural areas, or recreational facilities
- Proposed land use is being placed in an area that is currently exposed to some source of nuisance (e.g., noise, public safety, flooding) and the level of this nuisance is considered significant

The associated impact of an action would be considered less than significant if:

- The action is only marginally inconsistent with public policies
- The action does not completely prevent the use of adjacent resources
- The action's existing nuisance level is less than significant.

6.2.3 No Federal Action (Alternative Plan 1)

The No Federal Action Alternative, as described in Chapter 4, would have a minor, indirect adverse effect on land use. No direct change in land use would result from the No Federal Action Alternative. However, periodic flooding could influence future land use changes by discouraging investment, resulting in deterioration of structures and loss of property value for flood-prone areas. Land use changes anticipated in the Future Without Condition (see Section 5.16) would be expected to occur under this alternative.

In addition, the No Federal Action Alternative would not address existing incompatible land use, specifically development within the flood plain and the associated public safety and health issues related with recurrent flooding throughout Floyd County.

This alternative would not by itself result in inappropriate commitment of land resources. However, further development in the floodplain by others could be inconsistent with the NFIP. Also, the No Federal Action Alternative would not address existing public land development within the 100-year floodplain.

6.2.4 Structural (Alternative Plans 2 and 3)

Alternative Plans 2 and 3, as described in Chapter 4, each include a floodwall within the City of Prestonsburg and voluntary nonstructural measures throughout the remaining Floyd County implementation area. Both Alternative Plans would have an overall beneficial effect on land use.

Nonstructural Areas: Outside the floodwall construction area, relocation of residences and businesses to flood safe locations could directly change land use patterns along the

Levisa Fork floodplain. Long term beneficial impacts could be realized because habitation of the floodway would generally be prohibited, thus allowing the land to revert to a natural condition. Evacuated land within the floodplain could be used for such things as passive recreation or wildlife habitat. However, it is possible that some of the land outside the floodway, but within the project area, could be filled and redeveloped. The amount of land use change within the floodplain would depend on the participation rate for this voluntary program.

The amount of clearing and grading of upland areas for resettlement is difficult to quantify because it is dependent on participation rates and on individual decisions made by relocated persons, businesses, churches, etc. The exact number of structures eligible for relocation compared to those eligible for floodproofing is not known at this time. A portion of the displaced population would relocate to existing vacant structures or leave the area. However, community cohesion in the area is moderately high (see **Section 5.11.8**), and most of the displaced population would be expected to remain in the area. Conversion of forest to accommodate sufficient additional housing is not considered to be a significant impact since most of Floyd County's 393 square miles are forested.

Structural Areas: Either alternative would be consistent with local land use plans. The Floyd County Fiscal Court has been actively involved in the development of alternative flood protection plans. No conflicts with existing zoning ordinances or inappropriate commitment of resources is anticipated. However, a change in land use would occur from the acquisition and removal of nine residences for construction of either floodwall (Alternative Plan 2 or 3). Relocation impacts are discussed in **Section 6.10**. Flat land within the City of Prestonsburg is already approximately 90 percent developed, limiting the amount of unoccupied or underdeveloped land protected from flooding and available for development. It is likely that vacant structures and vacant lots will be infilled or redeveloped after the floodwall is in place. Land values could rise as a result of the flood protection.

Areas within the CWL but outside the permanent structural footprint (including a buffer for access) would be replanted or redeveloped. Disturbed areas landward of the floodwall would be restored to at least their current condition in consultation with Floyd County and the City of Prestonsburg regarding the land's intended use. Due to the limited acreage converted and the relatively low quality of the existing habitat, this impact is not considered significant.

Land acquired by Floyd County between the floodwall's permanent footprint and the Levisa Fork would be permanently precluded from development through deed restriction and would return to passive use, providing an overall beneficial impact. Disturbed areas and currently nonforested areas riverward of the permanent footprint would be planted and seeded with native tree and shrub species to enhance the existing riparian corridor (See Section 6.8.6, *Ecological Mitigation Plan*).

Riparian areas are publicly owned behind Prestonsburg High School and BSCTC and would remain public property. The construction of a floodwall would impede public access to the riparian areas adjacent to the Levisa Fork riverward of the floodwall. This impact is not considered to be significant because each alternative includes gate closures and pedestrian access points that will be open except during weather events that would be expected to produce flooding. Alternative Plan 2 would have a relatively larger impact to public access to riparian areas because the floodwall would require relocation of an existing walking path along the river at the BSCTC. The new path alignment would be inside the floodwall protection area.

Temporary land use conflicts would be expected from construction dust and noise, as well as temporary public health concerns regarding traffic and heavy machinery (see Sections 6.5, 6.6, 6.10, 6.12, and 6.13). These conflicts are generally considered to be less than significant when mitigated using BMPs and coordination with local officials and emergency management personnel.

Borrow Areas: No change in land use is planned (undeveloped), although land cover will change. Direct impacts to one or more borrow areas would include clearing of trees and vegetation, and removal of up to six feet of soil or rock. A buffer will be created between areas used for soil borrow and streams. This is not considered to be a significant land use impact. Potential impacts to water resources and the biological environment are discussed in Sections 6.7 and 6.8, respectively.

- PB2 (Soil Borrow) – Unfavorable borrow site conditions (steep slopes, woody vegetation and proximity to trailers) make this site a "last resort" candidate for borrow materials. A temporary incompatible use would occur from borrow activities near a residential area. Upland forest vegetation would be cleared for borrow activities. The site would be revegetated using native grasses following rock removal.
- Spurlock Creek (Soil Borrow) – This site consists of a mowed field traversed by Spurlock Creek. The riparian corridor is approximately 3 feet wide on each side of the stream. Removal of borrow material would involved excavating 3 feet of the top soil layer. The stream would be avoided during borrow activities. The site would be revegetated using native grasses following soil removal.
- Granny Fitz Branch (Soil Borrow) – This site consists of a mowed field with a small creek bordering and then bisecting the area. The stream borders the southern side of the open field, flowing along the base of an adjacent slope. A temporary incompatible use would occur from borrow activities near a residential area. The stream would be avoided during borrow activities. The site would be revegetated using native grasses following soil removal.

Mitigation: For both alternative floodwall plans, several pedestrian access points would partially mitigate the loss of open access to the Levisa Fork. For Alternative Plan 2, a pedestrian access in the floodwall at the community college would allow access to the river and the existing walking path. In addition, the Proposed Action would include relocation of that part of the walking path directly in the footprint of the floodwall.

Areas where clearing or disturbance of trees and vegetation is necessary would be replanted and restored. They would be planted and seeded with native tree and shrub species to enhance the existing riparian corridor. NPDES construction permit conditions would be followed to avoid any impacts on streams.

6.2.5 Nonstructural Alternative (Plan 4)

Alternative Plan 4, as described in Chapter 4, includes voluntary nonstructural measures throughout the entire Floyd County implementation area, including the City of Prestonsburg.

In Floyd County outside of Prestonsburg, the impacts to land use would be the same as those discussed in Section 6.2.7. In addition, the City of Prestonsburg would be part of the nonstructural program, with individual structures evaluated for voluntary relocation or floodproofing. The pattern of land use could change depending on the voluntary relocation participation rate. Most of the public buildings in downtown Prestonsburg that are eligible for the program would relocated through a relocations contract process rather than floodproofed due to their size and proximity to each other. Socioeconomic impacts and community cohesion are discussed in Section 6.10.

No impacts to borrow areas would occur, as no floodwall would be constructed.

6.3 Visual and Aesthetic Resources

6.3.1 Significance Criteria

Adverse changes to the visual quality or character of an area generally result when new, aesthetically negative elements are added or when positive, natural, or man-made features that contribute to the quality and character of an area are removed. If a proposed action's elements were to contrast dramatically with the setting, and if this contrast were to lower the overall visual cohesiveness of the visual composition, then a significant visual character impact would occur.

A significant visual quality impact would also occur if an action's elements would starkly contrast with their setting and would result in a cluttered, disorganized, and distracting appearance. A significant view quality impact would occur if an action would cause the loss of a viewing point such that it is no longer available to the general public or if an action element would block a view corridor that has an identifiable view scene and viewing point. The view scene must be a significant and unique public view, such as the ocean, bay, urban skyline, natural area, major landform, or other waterway.

Aesthetic and scenic qualities can be affected in a variety of ways; impacts can be severe or subtle. Both positive and negative impacts represent visual changes to users in a particular area. These impacts can be assessed by analyzing the design of a project, the project's effects to landmarks and cultural resources, and changes in the natural environment due to the implementation of the project. Adverse and non-adverse impacts to cultural resources and landmarks are also discussed in **Section 6.9,** Cultural Resources, and **Section 6.11**, Recreational Resources.

This analysis provides a general assessment of aesthetic and scenic impacts to the implementation area measured in terms of value, scale, and extent. Impacts are discussed in relation to the City of Prestonsburg as well as Floyd County as a whole.

6.3.2 Methodology

The potential impacts to aesthetic and scenic resources are evaluated in terms of value, scale, and extent. Value can be defined as benefiting, distracting, or leaving unchanged an individual's sense of visual enjoyment. The scale of the change can be either minor or major, minor representing changes in scale that complement the existing scene and major representing changes in scale that significantly alter or eliminate the existing scene. The extent of the change is a measure of the visibility of the change and the number of persons affected by the change.

6.3.3 No Federal Action (Alternative Plan 1)

Because a floodwall would not be constructed, no direct change to aesthetic and scenic resources would occur. The existing disincentive for investment in existing structures and resultant structure deterioration, as well as damages caused by flood events, would continue to contribute to a long-term adverse aesthetic impact.

6.3.4 Structural (Alternative Plans 2 and 3)

Nonstructural Areas: In the larger Floyd County nonstructural implementation area, no floodwalls would be constructed. Aesthetic impacts would result from construction of ringwalls around buildings. The degree of visual impact would depend on the structure and its visibility to the public. Other structures would be protected by nonstructural methods such as raise-in-place, move on site, or veneer walls. Localized impacts to aesthetic and scenic resources would include raising homes up to 12 feet. Raising in place completely alters the visual quality of a structure, especially any that are raised more than eight feet. The Section 202 program does not offer aesthetic measures to mitigate these visual impacts.

Some of the existing structures in the floodplain would be removed through the voluntary evacuation program. Removal of structures in this program can result in a very piecemeal, incongruent look in an other wise visually appealing community (such as the ordered look of homes aligned along a street). The Section 202 program does not offer mitigation for this type of visual impact. However, permanent evacuation could also open up views of the Levisa Fork and be a positive visual impact within the Levisa Fork corridor.

Structural Areas: The floodwall and gates would be dominant, co-dominate, and subordinate in the Prestonsburg community depending upon individual viewpoints.

Most of the historic properties in Prestonsburg, including the Historic District, are located south of the floodwall. In this area, flood protection would be achieved by raising roadway centerlines and construction of a short wall (up to 2.5 feet tall). A minor impact to visual and aesthetic resources would be expected.

The existing scenery would not substantially change for viewers traveling along roadways in Prestonsburg. In the southernmost portion of the structural area, changes will be limited to raised roadway centerlines and curbs. In the central business district south of the KY 114 bridge, the floodwall would be behind existing buildings and would not be readily visible from Arnold Avenue.

For the general public, the floodwall would be most visible from North Arnold Avenue between the First Commonwealth Bank and the KY 114 Bridge. An existing gate pump station is located near the KY 114 Bridge in the downtown Prestonsburg area, but no existing floodwall is currently in place. Along North Arnold, wall heights would range from zero to approximately five feet. The floodwall would block casual views of Trimble Creek and the Levisa Fork in this area. However pedestrians would be able to see the river from some places along the sidewalk or by walking near the wall. An additional minor visual impact would occur from the changed appearance of Trimble Creek. Stone slope protection would be added to stabilize the banks.

Views of the historic West Prestonsburg Bridge would not change appreciably for the general public. The bridge is most visible when crossing the KY 114 bridge and from West Prestonsburg. These two views of the bridge would not be impeded by the proposed floodwall with either Alternative Plan, although the presence of the floodwall would change the viewscape.

The long-term river view from West Prestonsburg would change somewhat. Current views of the riverbank and the homes along North Arnold Avenue are obscured part of the year by vegetation. The floodwall on the opposite side of the Levisa Fork would be constructed at the top of bank. Existing trees on the lower bank would be undisturbed. In areas where the riparian corridor is currently mowed, it would be planted with trees following floodwall construction.

Local impacts to aesthetic and scenic resources would be severe for property owners along the Levisa Fork in the residential neighborhood where the floodwall would be a dominant feature. Either floodwall would remove approximately nine homes located along the river bank in these residential neighborhoods. Views in this area, including the Levisa Fork and the historic West Prestonsburg Bridge, would be significantly altered for remaining residents who live in and/or visit homes located in the residential neighborhoods along North Arnold Avenue (north of KY 114), Music Street, and Burke Street.

The floodwall would be co-dominant with the Prestonsburg High School for visitors, staff, and students. For either Alternative Plan 2 or 3, the floodwall would be constructed at the top of bank behind the school and athletic field. In addition, a pump station and ponding area would be located along May Branch just north of the school.

In the vicinity of Prestonsburg High School, views of the floodwall become a subordinate feature when viewed from North Arnold Avenue, Blackcat Boulevard, or North Lake Drive. The floodwall would not be dissimilar to the existing visual landscape near the athletic field and high school complex. However, near May Branch, the floodwall, pumping station and ponding area would be more visually intrusive. The floodwall would be most visible to passers-by on Blackcat Boulevard as it crosses May Branch and reaches heights of 35 feet (because of the deep May Branch ravine).

In addition, open land would replace acquired residences and businesses that elected to participate in the voluntary relocation program, which may affect community cohesion.

Borrow Areas: No direct impacts would occur from use of the three areas to obtain fill for the proposed project.

- PB2 (Soil Borrow) **–** Localized visual impact would occur for residents at adjacent trailer complex. Portions of this densely vegetated hillside would be cleared and soil removed.
- Spurlock Creek (Soil Borrow) – Localized visual impact from removal of soil from grassy areas. Site is not near homes.
- Granny Fitz Branch (Soil Borrow) Visual impact to residential area bordering site. Soil would be removed from grassy area, avoiding stream.

Mitigation**:** Mitigation features for structural measures could include, but are not limited to wall texture or graphics (e.g., use of forms to simulate stone facings or textures), wall color, landscaping, maintenance commitments, sidewalks, door openings, and community history that would be incorporated as part of the final design elements.

To mitigate the visual impacts of the floodwall/levee structure in areas located in or near the construction work limits, the following measures would be employed where applicable and feasible:

The reduction or elimination of flood insurance would offset some of the visual impacts for individual homeowners.

- Incorporation of wall graphics to transform the wall into a community “work of art” capturing the history or spirit of its residents
- Incorporation of wall texture and color
- Incorporation of plant material, where appropriate, to buffer and enhance views of the floodwall
- Incorporation of sidewalks and door openings along the floodwall, where feasible, to allow continued viewing access and use of the Levisa Fork

6.3.5 Nonstructural (Alternative Plan 4)

Visual and aesthetic impacts for Alternative Plan 4 would be the same as Alternative 1 except for the Prestonsburg areas. The visual change would depend on the number of relocations/structure removal, the types of floodproofing offered and the degree of participation. An architecturally unbalanced view could result if some homes in the city are raised up to 12 feet while others are not. Relocation of public buildings could permanently change the character of the city.

6.4 Topography, Geology, and Soils

6.4.1 Impact Analysis Methodology

Existing and background information pertaining to topography, geology, and soils of the study areas was summarized and presented in **Section 5.5**. Each addressed project component is reviewed and evaluated to identify potential impacts (positive or negative) relative to conditions that currently exist. Methods for assessing potential impacts to geologic resources generally include:

- Location of geologic resources in relation to physical locations of the Proposed Action
- Identification of direct potential impacts
- Identification of indirect potential impacts
- Assessment of potential direct and indirect impacts to these resources.

Geologic impacts include all effects that result from interaction between the project and the geologic environment. For example, project impacts could include changes in erosion rates, destruction of vital mineral resources, loss of prime and/or unique farmlands, or changes in the exposure level of people and structures to geologic hazards.

Identification of geologic impacts has been completed using available geologic studies, environmental documents, reports, on-site observations, and engineering judgment to make reasonable inferences about a proposed action’s potential effects on geologic setting (as described in the “affected environment” sections of this document). In addition, geologic impacts were evaluated in a context relative to regulatory requirements or guidelines. Regulatory requirements include state and local building codes, grading ordinances, and restrictions on development in protected areas (or in areas subject to specific geologic hazards).

6.4.2 Significance Criteria

The potential significance of impacts from the implementation of a project component is defined in both relative and absolute terms. Relative criteria base significance on context and tend to be subjective, while absolute criteria are defined in terms of objective standards. The criteria used to determine the level of impact to geology, topography, and soils that could occur with implementation of an action are as follows:

- Increase in the exposure of people or structures to geologic hazards that could result in injury, acute/chronic health problems, loss of life, or major economic loss
- Result in a substantial loss of soil (e.g., through increased erosion) or loss of access to economically significant mineral deposits

- Adversely affect human health or environmental receptors (e.g., through exposure to toxic chemicals or irritants present in geologic or soils materials)
- Adversely alter existing geologic conditions such that existing or potential benefits of the geologic resource are reduced
- Conflict with existing federal, state, or local statutes or regulations pertaining to geologic or soils resources
- Permanently damage or alter a unique or recognized geologic feature or landmark
- Substantially alter the existing function of the landscape (e.g., altering drainage patterns through large-scale excavation, filling, or leveling).

An impact is generally considered significant if it meets any of the following significance criteria:

- The resource would impact human health or safety
- The action would include large-scale modifications (i.e., greater than standard construction grading) to extant topography
- The action would eliminate or substantially reduce a unique or rare geologic, topographic, or soils resource within the region, such as prime and unique farmlands
- An individual component project would result in disturbance of over 100 contiguous acres of previously undisturbed area.

Specific resource characteristics that are considered part of this impact analysis include:

Soils: On-site soil characteristics involve several factors that could affect proposed construction projects at applicable geographic locales. These factors include depth to bedrock, plasticity index, shrink-swell potential, and corrosion potential. In addition, actions proposed on areas that meet any of the following criteria are considered to have potentially significant impacts and/or require special planning prior to construction:

- Slopes greater than 8 percent
- Severe building site development rating
- Low plasticity index
- Shallow depth to bedrock
- Moderate to high shrink-swell potential
- High corrosion potential.

Geological Hazards: Proposed structures with subsurface components are evaluated in relation to the factors listed above and to the potential for radon buildup in proposed basements or crawlspaces. A significant impact would be registered if a related potential impact to human health and safety were to exist.

Seismic Hazards: The potential for impacts associated with faulting, ground acceleration, and ground shaking associated with earthquakes is evaluated based on the distance of the Proposed Action to known fault zones. A significant impact would be registered if a related potential impact to human health and safety were to exist.

Mineral Resources: The significance of mineral resources is determined by the type, distribution, occurrence, and economic potential of the resource that the Proposed Action affects. Evaluation of impacts is based upon the significance of the affected mineral deposit relative to the known and expected reserves of this mineral on a local, state, national, and global basis.

Paleontological Resources: Impacts to paleontological resources could occur if an action would greatly disturb a geological formation known to contain fossils that might contribute scientific information on a prehistoric species, habitat, or evolutionary stage. Paleontological resources are generally considered significant if they are rare, unique, or have scientific value (i.e., can yield information important in understanding the past). Paleontological resources are significantly affected if their characteristics are altered or if resources are removed from their natural environment without proper cataloging. Archaeological resources that may occur in soils above the bedrock layers are evaluated in **Section 6.9**.

6.4.3 No Federal Action (Alternative Plan 1)

The No Federal Action Alternative would result in no direct impacts to the existing topography, geology, and soils in the areas. No change in erosion rates, radon buildup, destruction of mineral resources, or significant loss of prime and/or unique farmlands would occur. The potential for seismic events in this area is relatively low, and no change would be expected regarding risk to human health and safety with respect to seismic events. No direct impacts to paleontological resources would occur.

Erosion and sedimentation associated with periodic flooding would continue. Erosion of Levisa Fork banks associated with recurrent flooding would also continue. The existing instability of the banks of May Branch, Trimble Branch and Campus Branch at their confluence with the Levisa Fork would be expected to continue or worsen over time.

6.4.4 Structural (Alternative Plans 2 and 3)

For either Alternative Plan, no conditions conducive to radon buildup would be created through implementing the Proposed Action. Radon is a radioactive gas that comes from the naturally occurring breakdown of elements in soil, rock and water. It gets into the air by seeping up through the ground, or through well water. A home or other structure may trap radon inside, where it can build up. The USEPA considers Floyd County to have a moderate risk of radon gas buildup.

The potential for seismic events in this area is relatively low, and implementation of the Proposed Action would not be expected to change the risk to human health and safety with respect to seismic events.

No significant mineral resources would be affected by implementing the Proposed Action. Mineral resources, if they are present under the proposed floodwall alignment, would need to be left in place to assure the integrity of the wall. No plans for resource extraction in these areas have been identified.

Nonstructural Areas: Minimal impact to the geology and soils in the Floyd County nonstructural implementation area are anticipated. Direct impacts would be limited to relatively small areas where some of the nonstructural measures (raise-in-place, single-facility ringwalls, etc.) would occur.

Indirect impacts to geology and soils could result from clearing and grading activities associated with the relocation of residences and businesses to flood safe locations. Because individual contractors are required to obtain permits and use BMPs to control erosion during construction, this is not considered to be a significant impact.

Structural Areas: Minor direct impacts to geology and soils would include localized soil disturbance during the construction of either floodwall. Soil disruption in the construction areas, borrow areas, and access roads would temporarily increase erosion in these areas. Disturbance would occur principally at the site of construction activities, access roads, and staging areas.

Construction of a floodwall on the banks of the Levisa Fork would not directly impact erosion rates. However, the continuing erosion of the Levisa Fork banks could jeopardize the floodwall's structural integrity and thereby increase the risk to human health and safety. Slope protection measures would be needed to protect the flood protection system from failure due to erosion of the riverbank, and have been incorporated into the design of both Alternative Plans. These measures are described below.

The extent of slope protection needed was evaluated for the two feasible structural measures. The lower riverbank slopes in both areas would need to be protected using an armored toe consisting of a wedge of 12-inch diameter stone. Applicable locations identified by the design team include the reach between floodwall Stations 57+00 and 62+00 (between the Commonwealth bank and the SR 114 bridge in downtown Prestonsburg) and between floodwall Stations 105+00 and 124+00 (between Dickerson Street and Porter Lane). Vegetation would be removed from the lower slope, and slopes would be graded prior to stone placement. A geotextile fabric should be selected and placed on the slope to provide separation between slope soils and strength to the stone armoring. The armored toe will be approximately ten feet wide and five feet high and will be founded about two feet below the normal river level. Vegetation will be allowed to naturally establish over this armored toe (for aquatic impact discussion, see Section 6.8).

More numerous reaches of the upper slope would need to be protected from erosion by using stone. These areas have been identified as having higher potential for localized erosion of the upper slope because of high river velocities. Such erosion can lead to sliding or overturning failures of concrete structures, or slope failures through earthen flood control structures. Upper slopes in all identified reaches will be regraded to a stable geometry before placing a 3-foot thickness of 24-inch stone over a geotextile filter in these areas. This erosion protection system is mostly conventional and more proven than other configurations. This stone must be kept clear of vegetation to ensure its functionality throughout the project's design life. This necessary slope protection would result in a loss of riparian vegetation, with potential indirect impacts to the aquatic and terrestrial communities. These impacts are discussed in Section 6.8

The USACE has previously determined that the proposed project would affect properties included in or eligible for inclusion in the National Register (NR) of historic places, including subsurface cultural resources. Impacts to subsurface cultural resources are discussed in **Section 6.9**.

Borrow Sites: Direct impacts to geology and soils would also include up to five feet of soil and/or rock removal from one or more of the borrow sites. Disturbance would occur principally at the borrow sites. Soil disruption in the borrow areas and access roads would temporarily increase erosion in these areas (for aquatic impact discussion, see Section 6.8).

Mitigation: Good engineering practice and standard erosion control procedures would be implemented to minimize the effects of erosion during construction activities. Bank stability measures, including the armored toe and stone slope protection measures discussed above would be incorporated into the floodwall design. In addition, cleared and disturbed areas would be replanted and reseeded to minimize the effects of erosion. In borrow areas where all soil has been removed, replacement topsoil will be added to facilitate revegetation.

6.4.5 Nonstructural (Alternative Plan 4)

Alternative Plan 4 would result in minimal impact to the geology and soils in the Floyd County implementation area. Impacts from Alternative Plan 4 would be similar to the nonstructural portion of Alternative Plans 2 and 3. Direct impacts would be limited to relatively small areas where some of the nonstructural measures (raise-in-place, single-facility ringwalls, etc.) would occur.

The Prestonsburg area would be part of the nonstructural program, with individual structures evaluated for voluntary relocation or floodproofing. Minimal impact to the geology and soils are anticipated. Indirect impacts would be limited to individual parcels with clearing and grading activities associated with the relocation of residences and businesses to flood safe locations. Because individual contractors are required to obtain NPDES permits and use BMPs to control erosion during construction, this is not considered to be a significant impact.

No impacts to borrow areas would occur, as no construction would take place.

Mitigation: Good engineering practice and standard erosion control procedures would be implemented to minimize the effects of erosion during construction activities.

6.5 Air Quality

6.5.1 Impact Analysis Methodology

Existing and background information pertaining to air quality for the study areas was summarized and presented in **Section 5.6**. Air quality impacts have been evaluated in terms of emissions associated with the project components.

Types of air emissions included in the evaluation are carbon monoxide (CO), nitrogen oxides (NO_x), Volatile Organic Compounds (VOCs), sulfur oxides (SO_x), particulate matter with a diameter of 10 microns or less (PM_{10}), and lead (Pb). Because ozone (O_3) emissions cannot be calculated directly, VOCs and NO_x, which are precursors to O_3, are used as surrogate indicators of this pollutant.

The air quality impacts discussion focuses on the construction phase of the project because it is the primary activity with impact potential. Air emissions, for the most part, would be from construction vehicle exhaust and fugitive dust from soil disturbance. The evaluation is qualitative and is based on construction activity types, equipment type and use, and local climate and soil conditions. Mitigation measures to avoid and minimize potential nuisance dust conditions and construction equipment impacts to nearby residents are also discussed.

6.5.2 Significance Criteria

Any increase above existing emissions levels would have an adverse impact on air quality. Specifically, an impact is considered significant if:

- Increased air emissions exceed applicable laws regarding control and abatement of air pollution
- The action or alternative exceeds or otherwise violates conditions of the State Implementation Plan (i.e., the *de minimis* thresholds from the CAA General Conformity Rule)
- Special circumstances substantially increase potential significance despite the fact that the increased emissions do not meet the first two significance criteria. These special circumstances could include the presence of unusually sensitive receptors in the area, scientific controversy over the action or its mitigation method, or other similar circumstances recognized under NEPA.

Factors considered in determining whether or not project components would have a significant impact on air quality include the following:

- The amount of net increase in annual emissions of criteria pollutants at applicable geographic locales. The 100-tpy CAA conformity *de minimis* threshold does not apply to the Floyd County area because it is in attainment with air quality standards.

- Whether or not relatively high emissions would occur on a continuing basis for periods longer than the time frame of relevant ambient air quality standards (e.g., 8-hour periods for O_3 precursors, 3-hour and 24-hour periods for SO_x, 24-hour periods for PM_{10}).
- Whether or not emissions of precursors to O_3 or other secondary pollutants would occur in such quantities and at such locations as to have reasonable potential to cause or contribute to a violation of Federal or state ambient air quality standards.
- Whether or not emissions of hazardous air pollutants could exceed state standards or other hazardous air pollutant exposure guidelines at locations accessible to the general public.

6.5.3 No Federal Action (Alternative Plan 1)

Under the No Federal Action Alternative, no impacts to air quality would occur. The air quality impacts of the No Federal Action Alternative would be the same as the existing environment discussed in **Section 5.6**. Localized fugitive dust and vehicle emissions associated with cleanup from recurrent flooding events would continue.

6.5.4 Structural (Alternative Plans 2 and 3)

The duration of floodwall construction for Alternative Plans 2 and 3 is projected to last three to four years.

In general, floodwall construction activities have the potential to cause localized temporary, nuisance air quality impacts. Emission sources include diesel exhaust and fuel odors associated with operation of heavy equipment, engine emissions from personal vehicle use associated with construction, and off-site diesel and fugitive dust emissions associated with excavation, earth-moving, and construction activities (including hauling dirt and stone from borrow areas).

Due to the age of existing structures, demolition activities required for floodwall construction have the potential for asbestos fibers to become airborne. The amount of dust emissions from a construction or demolition site depend on the size of the site, soil type and conditions, the intensity of activity, wind speed, and dust suppression activities used. Visible particulate emissions crossing the property boundary, in this case the construction limits boundary, would be considered a violation of 401 KAR Chapter 63:010.

Nonstructural Area: The nonstructural component of either plan is projected to last between ten and fifteen years. Direct short-term impacts would include increased localized air emissions from construction activities. Typical activities expected include acquisition and demolition of residences and businesses; raising residences in place for a higher first-floor elevation; and constructing ring-walls around individual businesses or institutional structures. Because each eligible structure would be evaluated and addressed individually, the scope of each individual activity would be of a small scale and of short duration. Residences and establishments immediately adjacent to the construction boundaries may be affected by dust and/or exhaust fumes in outdoor areas.

Structural Area: Direct short-term impacts would include increased localized air emissions from construction activities. Construction would be expected to proceed in sections, so that a given residence would be most inconvenienced for an approximate three-month period rather than the entire floodwall construction period. In addition, construction activities tend to be intermittent, with the type of activity changing as construction progresses.

Residences and establishments immediately adjacent to the construction boundaries may be affected by dust and/or exhaust fumes in outdoor areas. Sensitive receivers adjacent to the construction boundary, staging areas, and access roads could be susceptible to construction-related air emission impacts, particularly if atmospheric and site conditions result in off-site particulate or dust emissions. Elderly persons, and persons with respiratory disabilities, may also be impacted by air emissions from the proposed project. Nearby residents may experience inconveniences associated with dust accumulation on vehicles, homes, and other items.

Residences that would be most affected by floodwall construction include those along North Arnold Avenue, Music Street and Burke Avenue that are directly adjacent to the floodwall alignment. Residents along Clifton Street (approximately 45 residences) would be most affected by the May Branch staging area.

Non-residential areas that would be most affected by fugitive dust and odor from construction of either floodwall design include the First Commonwealth Bank on North Arnold Avenue, the Glyn View Plaza on University Drive, the Community United Methodist Church on Burke Avenue, and Prestonsburg High School. The BSCTC would be affected by Alternative Plan 2.

Prevailing winds are from the south and would not be likely to be a strong influence on construction air quality.

Minor direct long-term impacts would occur from ongoing operation and maintenance of the floodwall components. The pump stations would be powered by natural gas and would run only during flood event and emissions would be minor and temporary. Emissions from occasional maintenance vehicles would also be minor and temporary.

Borrow Areas: Residents adjacent to borrow areas, and residents along the transport route may be affected by dust and/or exhaust fumes in outdoor areas. Although this would be a temporary impact, it could be significant for sensitive receptors.

Mitigation: Construction would be performed in accordance with the State Implementation Plan, and in compliance with applicable Kentucky Division for Air Quality requirements. The following actions would be noted in the construction specifications to minimize off-site air emissions and air quality impacts associated with construction activities:

- Cover dump trucks when hauling soil on main highways;
- Maintain trucks to prevent excess emissions;
- Shut down heavy equipment when not needed;
- Use a water or approved chemical spray to suppress dust on roads, materials stockpiles, demolition areas, and other surfaces if required;
- Utilize silt fences to contain soil in the construction zone;
- Broom-clean excess soil from heavy equipment and trucks leaving the construction zone to prevent off-site transport;
- Conduct asbestos inspections of each structure identified for demolition; and
- Special handling and removal of asbestos-containing materials during demolition to prevent release of asbestos fibers.

6.5.5 Nonstructural (Alternative Plan 4)

The same types of short-term air emissions (equipment exhaust, fuel odors, fugitive dust, and asbestos fibers) are to be expected for the acquisition and demolition of residents and businesses or raising residences in place for a higher first-floor elevation. Ring-wall construction around individual businesses or institutional structures would not be associated with asbestos fibers but would have the other types of short-term emissions. Because each eligible structure would be evaluated and addressed individually, the scope of each individual activity would be smaller and shorter in duration compared to floodwall construction. No long-term impacts are anticipated.

The Prestonsburg area would be part of the nonstructural program, with individual structures evaluated for voluntary relocation or floodproofing. Short-term impacts would be of the same type but could be worse because both population and structure density are higher.

Mitigation would include the same BMPs as listed in Section 6.5.4.

6.6 Noise

6.6.1 Impact Analysis Methodology

Existing and background information pertaining to noise for the study areas was summarized and presented in **Section 5.7**. This noise impact analysis section evaluates potential effects to the local noise environment induced by each of the considered alternatives. Each project component is reviewed and evaluated to identify potential impacts (positive or negative) relative to current conditions.

Noise impacts associated with the Proposed Action have been evaluated using available noise data for various types of activities. Major noise sources associated with project alternatives include personal vehicle use and construction activity. Noise evaluation for construction activity used estimated daily operating hours per item, generalized equipment numbers, and generalized equipment noise generation data.

6.6.2 Significance Criteria

Results from noise monitoring and noise source evaluation have been compared with various standards and guidelines in order to evaluate the significance of predicted noise levels. Considered noise criteria include federal, state and community noise standards (as applicable). The noise evaluation considered long-term average noise level conditions and short-term noise levels associated with discrete noise events. Other relevant noise exposure conditions (e.g., time of day, background noise levels, the repetition pattern of brief noise events, and the duration of individual noise events) have also been considered in noise impact evaluation. Specific considerations for evaluating the significance of noise impact include the following:

- Whether or not noise levels would exceed state or community noise standards at the site boundaries
- Whether or not land use compatibility problems would be created
- Whether or not impulse or other short-term event noise levels would likely cause significant annoyance to more than 15 percent of exposed individuals at locations accessible to the general public.

In evaluating the potential for hearing damage (Either Temporary Threshold Shift, or TSS and Noise-Induced Permanent Threshold Shift, or NIPTS), the noise level and duration of exposure are considered. For example, NIPTS would be produced by unprotected exposures of 8 hours per day for several years to noise above 105 dBA. Similarly, TSS would be based on exposure to a steady noise level of 80 to 130 dBA, increasing with duration of exposure (Canter 1977).

6.6.3 No Federal Action (Alternative Plan 1)

No noise impacts would occur from the No Federal Action Alternative. Local noise conditions would continue as described in Section 5.7.

6.6.4 Structural (Alternative Plans 2 and 3)

Construction noise would significantly impact area residents, businesses, and schools during peak construction periods without taking measures to mitigate the effects. Construction activities generate noise by their very nature and are highly variable, depending on the type, number, and operating schedules of equipment. Construction projects are usually executed in stages, each having its own combination of equipment and noise characteristics and magnitudes. Construction activities of the proposed project are expected to be typical of other similar construction projects and will include mobilization, site preparation, excavation, placing foundations, heavy equipment movement, and installation of the flood wall components. The most prevalent noise source at construction sites is the internal combustion engine. General construction equipment using engines includes but is not limited to: heavy, medium, and light equipment such as excavators; roller compactors; front-end loaders; bulldozers; graders; backhoes; dump trucks; water trucks; concrete trucks; pump trucks; utility trucks; cranes; sheet pile drivers; man lifts; forklifts; and lube, oil, and fuel trucks.

Actual peak noise levels and associated vibration would vary at a given location based on line of sight, topography, vegetation, and atmospheric conditions. Relatively high peak noise levels in the range of 93-108 dBA would occur on the active construction sites, decreasing with distance from the construction areas. Construction workers who would be subjected to the highest noise levels would follow standard USACE and Federal Occupational Safety and Health Administration (OSHA) requirements to prevent hearing damage. **Table 6-1** presents peak noise levels that could be expected from a range of construction equipment during proposed construction activities.

Table 6-1. Peak Noise Levels (dBA, attenuated) Expected from Typical Construction Equipment

Source	Peak Noise Level (dBA)							
	Distance from Source (feet)							
	0	50	100	200	400	1,000	1,700	2,500
Heavy Truck	95	84-89	78-93	72-77	66-71	58-63	54-59	50-55
Dump Truck	108	88	82	76	70	62	58	54
Concrete Mixer	108	85	79	73	67	59	55	51
Jack-hammer	108	88	82	76	70	62	58	54
Scraper	93	80-89	74-82	68-77	60-71	54-63	50-59	46-55
Bulldozer	107	87-102	81-96	75-90	69-84	61-76	57-72	53-68
Generator	96	76	70	64	58	50	46	42
Crane	104	75-88	69-82	63-76	55-70	49-62	45-48	41-54
Loader	104	73-86	67-80	61-74	55-68	47-60	43-56	39-52
Grader	108	88-91	82-85	76-79	70-73	62-65	58-61	54-57
Pile driver	105	95	89	83	77	69	65	61
Forklift	100	95	89	83	77	69	65	61

Worst-Case Combined Peak Noise Level (Bulldozer, Jackhammer, Scraper)

	Distance from Source (feet)				
	50	100	200	¼ Mile	½ Mile
Combined Peak Noise Level	103	97	91	74	68

Source: USACE, 2003

Generally speaking, peak noise levels within 50 feet of active construction areas and material transportation routes would most likely be considered “striking” or “very loud”, comparable to peak crowd noise at an indoor sports arena (USACE 2003). At approximately 200 feet, peak noise levels would be loud, approximately comparable to a garbage disposal or vacuum cleaner at 10 feet. At ¼ mile, construction noise levels would generally be quiet enough so as to be considered insignificant, although transient noise levels may be noticeable at times.

Combined peak noise levels and associated vibration, when several loud pieces of equipment are used in a small area at the same time (as described in **Table 6-1**), are expected to occur during clearing and construction activities. Under these circumstances, peak noise levels could exceed levels that have the potential to damage a person's hearing, or over 90 dBA, could occur within 200 feet of the construction area, depending on equipment being used.

Noise levels would be quite loud, and transient noise levels could be above 90 dB within 200 feet of a construction area. Although these levels will be disruptive, no hearing damage would be expected for area residents. The intermittent nature of peak construction noise levels would not create the steady noise level conditions for an extended duration that could lead to hearing damage. In addition, indoor noise levels would be expected to be 15-25 dB lower than outdoor levels.

Other direct impacts from construction noise may include effects on wildlife. Construction impacts on wildlife are addressed in **Section 6.8** of this DEIS.

Indirect impacts include noise from worker commuting and material transport. Area traffic volumes and noise levels would increase as construction employees commute to and from work at the project areas, and delivery and service vehicles (including trucks of various sizes) transit to and from the site. Because trucks are present during most phases of construction and leave and enter the site via local thoroughfares, truck noises tend to impact more people over a wider area. For this project, persons living in residential areas near truck traffic routes to and from the project and borrow areas would experience increased traffic noise during day-time hours. Truck and delivery traffic is further discussed in **Section 6.13**, Infrastructure.

Nonstructural Areas: Direct short-term impacts would include increased localized noise from construction activities. Typical activities expected include acquisition and demolition of residences and businesses; raising residences in place for a higher first-floor elevation; and constructing ring-walls around individual businesses or institutional structures. Because each eligible structure would be evaluated and addressed individually, the scope of each individual activity would be smaller and shorter in duration compared to floodwall construction. Residences and establishments immediately adjacent to the activity would be most affected by construction noise.

No long-term land use compatibility problems would be created by noise generation related to the Proposed Action. Construction noise levels could cause annoyance to residents directly adjacent to construction areas. However, these short-term impacts would be mitigated to the extent feasible using BMPs. Long-term noise impacts would be minor.

Structural Areas: Sensitive receivers along the construction boundary would be directly impacted by general construction noise, based on the existing noise levels and anticipated use of construction equipment. Peak noise levels would be variable and intermittent because each piece of equipment is only operated when needed. Peak construction noise levels would be considerably higher than existing noise levels in all construction areas, although less so in the downtown areas.

Residences that would be most affected by noise from floodwall construction include those along North Arnold Avenue, Music Street and Burke Avenue that are directly adjacent to the floodwall alignment. Residents along Clifton Street (approximately 45 residences) would be most affected by the May Branch staging area.

Non-residential areas that would be most affected by noise from construction of either floodwall design include the First Commonwealth Bank on North Arnold Avenue, the Glyn View Plaza on University Drive, the Community United Methodist Church on Burke Avenue, and Prestonsburg High School. The BSCTC would be affected with Alternative Plan 2.

The floodwall would be constructed within 50 feet of Prestonsburg High School. Intermittent construction-related peak noise levels could interfere with school activities. The estimated duration of construction adjacent to Prestonsburg High School is three months. Transportation of materials past the school would occur throughout the construction period and would also increase noise levels at the school.

Once construction is complete, the floodwall structure would be expected to permanently change the characteristics of the ambient noise environment. Ambient background and transient noise sources generated on the inland side of the floodwall, such as traffic noise associated with US 23, would likely have some reflection to receivers near the floodwall. Conversely, receivers located near the floodwall may see reductions in transient noise created by railroad traffic just across the Levisa Fork, as well a reduction of natural sounds from the Levisa Fork (i.e., water and wildlife sounds).

Long-term occasional direct impacts would occur from noise, especially low-frequency noise generated by the proposed pump stations. However, the pump station would operate only during annual testing, flood conditions and heavy rain events. The pumps would be expected to have an operating noise level of approximately 70 dB at a distance of 50 feet (BLM, 2000). .

Borrow Areas: Short-term impacts would include noise from soil and rock excavation and transport. Residents along roads used to transport fill material from borrow areas to the project area, would be subjected to heavy truck traffic at a close distance. Residents adjacent to borrow areas are likely to experience intermittent noise related to excavation of the borrow material.

Mitigation: Construction would be performed in accordance with and in compliance with applicable USACE requirements. The following BMPs could be incorporated into construction specifications to limit noise impacts:

- Limit, to the extent possible, construction and associated heavy truck traffic between 9 p.m. and 7 a.m. This measure would reduce noise impacts during sensitive night-time hours.
- Shield noisy stationary equipment such as generators and compressors with acoustic barriers to reduce noise levels from such equipment.
- Locate stationary equipment as far away from sensitive receivers as possible.
- Select material transportation routes as far away from sensitive receivers as possible.
- Equip construction equipment engines with adequate mufflers, intake silencers, and/or engine enclosures to reduce their noise levels by 5 to 10 dBA.
- Shut down noise-generating heavy equipment when it is not needed.
- Maintain noisy equipment per manufacturer's recommendations.
- Require construction personnel to operate equipment in the quietest manner possible (e.g., speed restrictions, retarder brake restrictions, engine speed restrictions, etc.).
- Complete as much as possible of the floodwall near Prestonsburg High School and the BSCTC during the school summer recess to minimize impacts to school function.
- Perform construction activities off-site to the maximum extent feasible (e.g., fabricate concrete forms, etc.).
- Route heavy truck traffic away from sensitive receivers to the maximum extent possible.

6.6.5 Nonstructural (Alternative Plan 4)

The same types of noise sources (construction equipment and haul trucks) would be expected for the three types of non-structural activities: acquisition and demolition of residents and businesses; raising residences in place for a higher first-floor elevation; and constructing ring-walls around individual businesses or institutional structures. Because each eligible structure would be evaluated and addressed individually, the scope of each individual activity would be smaller and shorter in duration compared to floodwall construction. No long-term impacts are anticipated.

The Prestonsburg area would be part of the nonstructural program, with individual structures evaluated for voluntary relocation or floodproofing. Short-term impacts associated with ringwall construction could be worse because of the higher population and structure density in the downtown area.

Mitigation would include the same BMPs as listed in Section 6.6.4.

6.7 Water Resources

6.7.1 Impact Analysis Methodology

Existing and background information pertaining to ground and surface water resources, including local hydrology, water quality, sources of pollution, floodplains, water providers, and designated Wild and Scenic Rivers is summarized in **Section 5.8**. For this impact analysis, potential impacts to these existing resources are evaluated.

Identifying project impacts relies heavily on the use of available studies, reports, observations, and engineering judgment to make reasonable inferences about potential project effects, given an interpretation of the hydrologic setting described in this document's "affected environment" sections. In addition, some water resources impacts may be evaluated in a context relative to regulatory standards or guidelines. Regulatory standards include, but are not limited to, the following:

- Federal and state primary and secondary drinking water standards under the Safe Drinking Water Act (SDWA)
- State and local plans and policies that protect surface water and groundwater resources
- Limits on development of available surface water and groundwater resources
- Compliance with the Clean Water Act (CWA)
- Source water protection program requirements
- State water code regulations.

Methods for assessing potential impacts to water resources include:

- A comparison of the location of water resources in relation to the physical locations of proposed actions to determine potential direct and indirect impacts to these resources
- An examination of the activities proposed to determine potential for water resource impacts (e.g., new or altered potential sources of sedimentation)
- An analysis of potential changes in the consumption of water related to activities associated with proposed actions.

Available data related to water resources within the study areas are generally qualitative in nature. As a result, the analysis of potential impacts to local water resources through implementation of potential actions under the considered alternatives is similarly qualitative in nature. This analysis is based on potential action-induced changes to water quantity and quality. Since water resources continue beyond the property boundaries and are shared by downstream users, potential impacts to downstream users are assessed.

Project impacts are compared against both current conditions and future conditions. Potential actions would result in direct and indirect water resource impacts. Direct impacts may be short term (i.e., lasting only during construction) or long term (i.e., lasting during operation), occurring where water resources are altered or lost during the course of project construction and/or operation. Examples of direct impacts include changing water flow patterns, filling drainage areas, and loss of wetlands. This impact analysis is based on the worst-case scenario, which assumes that all water resources within the area of proposed activities would be affected.

Indirect impacts occur when project-related activities affect water resources in a manner other than direct resource loss. Indirect impacts may also be short term or long term. Siltation/Sedimentation from soil erosion and increased vehicular and human activity near, or directly adjacent to, water resources are examples of potential indirect impacts.

6.7.2 Significance Criteria

Determining the significance level of a potential water resource impact is based principally on assessing the magnitude of the impact as it affects water quality or quantity. Within this analysis, an action is considered to have a significant impact to water resources if the action would or could:

- Increase sedimentation loads within receiving streams, including potentially transporting contaminated soils to receiving surface waters
- Change the current protected water use classification of a stream
- Affect a designated Wild and Scenic River
- Alter local hydrology to the point that it increases potential downstream flooding or decreases water supply to dependent surface water features, including wetlands
- Impact Federal Emergency Management Agency (FEMA)-designated floodplains
- Be noncompliant with existing or proposed water quality standards or with other regulatory requirements related to protecting or managing water resources
- Reduce the availability of, or accessibility to, one or more of the beneficial uses of a water resource
- Substantially increase risks associated with human health or environmental hazards
- Impact established water resource buffers designated for water resource protection, including (as applicable) 50-foot exclusive setbacks to either side of ephemeral and intermittent streams, 100-foot exclusive setbacks to either side of permanent streams, and 100- to 200-foot exclusive setbacks around wetland perimeters, depending upon wetland value
- Impact jurisdictional “Waters of the U.S.,” including wetlands
- Require groundwater extraction that exceeds current design capacities or capabilities

- Result in a demand for water supply that exceeds the facility's current capacity

6.7.3 No Federal Action (Alternative Plan 1)

No new impacts to water quality would result from the No Federal Action Alternative. However, the Levisa Fork and other area water resources would continue to be adversely affected by human encroachment on riparian buffers, point and non-point source pollutants, and pollution associated with periodic flooding in developed areas within the floodplain. Periodic flooding would continue to flood wastewater treatment beds, sending contaminants into the Levisa Fork.

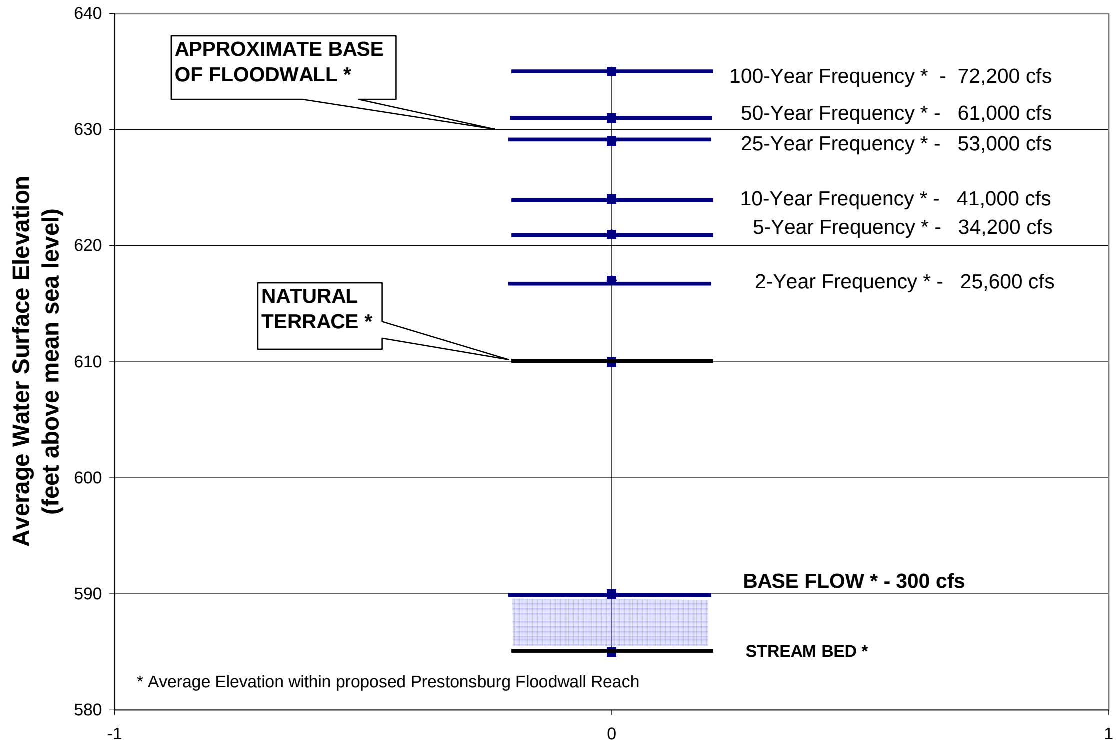
6.7.4 Structural (Alternative Plans 2 and 3)

Stream assessments followed the 2002 Kentucky Division of Water (KDOW) Methods for Assessing Biological Integrity of Surface Waters in Kentucky, when possible, and the 1999 Environmental Protection Agency (EPA) Rapid Bioassessment Protocol (RBP). RBP Habitat Assessment Field Data Sheets and Physical Characterization Quality Field Data Sheets were utilized for each stream analysis. USACE Louisville District Eastern Kentucky Stream Assessment Protocol (EKSAP) was used to calculate the Ecological Integrity Index (EII) of stream reaches. The EII ranges from 0 (worst condition) – 1 (best condition), and provides an indication of headwater stream disturbance compared to the least disturbed stream in the region.

Specific conductivity, a measure of the ability of water to pass an electrical current, was used as a key measure of habitat quality. Conductivity in water is affected by the presence of inorganic dissolved solids, which raise the conductivity, and organic compounds which do not conduct electrical current very well and therefore lower the conductivity. Conductivity increases with increasing water temperature. Generally, streams supporting good mixed fisheries have a range between 150 and 500 microsiemens per centimeter (μS/cm). Conductivity outside this range can indicate that the water is not suitable for some fish or invertebrates (EPA, 1997).

6.7.4.1 <u>Levisa Fork</u>

Because of the local topography, the Levisa Fork water elevation and flow volume raises markedly with even a small storm event. Chart **6-1** shows the water elevation and flow volume for various storm events as predicted by HEC-2 modeling (USACE, 2005). As shown in the chart, the flow volume for a 50 percent chance (2-year frequency) event is approximately 85 times base flow in this area, with a corresponding rise in water elevation of approximately 27 feet.



Data source: HEC-2 Modeling Between River Stations 51 and 55, Prestonsburg, KY, USACE 2005

Chart 6-1. Levisa Fork Water Surface Elevation and Flow Volume for Various Storm Events within Proposed Prestonsburg Floodwall Reach

Either proposed floodwall would be constructed along the top of the left bank of the Levisa Fork at approximate elevation 630-632 feet AMSL. This elevation represents average water elevation during a storm event with less than a four percent chance (25-year frequency) in this area. During smaller storm events, floodwaters would not rise to the base of the floodwall. The proposed armored toe bank stabilization would not significantly affect the stream characteristics during these smaller events.

During storm events larger than about the four percent chance event, floodwaters would be more restricted within floodwall limits, increasing water velocity. Construction of either floodwall would change the overflow patterns of the Levisa Fork at either end of the structures. Velocities would change both within and adjacent to the upstream and downstream reaches of the floodwalls. The floodwall would reduce overall flood storage by eliminating floodplain flow for the lengths of the floodplain during large storm events.

Review of HEC-2 modeling for with and without floodwall scenarios indicate that changes resulting from the proposed floodwall would not be significant. Predicted changes in stream velocity for channel, left bank and right bank locations are shown in **Table 6-2** for a 50 percent chance (2-Year frequency) event and a one percent chance (100-Year frequency) event. Channel and left bank velocity is predicted to change less than 0.6 feet per second. The increase in velocity would be greatest along the right bank opposite the floodwall, with increases up to 2.5 feet per second.

Table 6-2. Existing Levisa Fork Velocity and Predicted Change with Proposed Floodwall

Levisa Fork	Base Flow	50 Percent Chance (2-Year Frequency) Event		1 Percent Chance (100-Year Frequency) Event	
		Existing Stream Velocity (feet per second)	Change with Floodwall (feet per second)	Existing Stream Velocity (feet per second)	Change with Floodwall (feet per second)
Channel	0.3 – 2.7	4.0 – 8.0	0.1 – 0.5	5.8 – 11	0.3 – 0.6
Left Bank	n/a	1 – 3.7	-0.5 – 0	1.7 – 5.2	-0.6 – 0.3
Right Bank	n/a	0.8 – 4.3	0 – 1.3	1.3 – 5.1	0 – 2.5
Levisa Fork	Base Flow	Existing Stream Velocity (centimeters per second)	Change with Floodwall (centimeters per second)	Existing Stream Velocity (centimeters per second)	Change with Floodwall (centimeters per second)
Channel	9-82	122 – 244	3 – 15	177 – 335	9 – 18
Left Bank	n/a	30 – 133	-15 – 0	52 – 158	-18 – 9
Right Bank	n/a	24 - 131	0 – 40	40 – 155	0 – 76

Data source: HEC-2 Modeling between River Stations 51 and 55, Prestonsburg, KY, USACE 2005

Anticipated channel stream velocities under floodwall and no-floodwall conditions are presented in **Chart 6-2 and 6-3.** Effects to upstream and downstream areas would be minor.

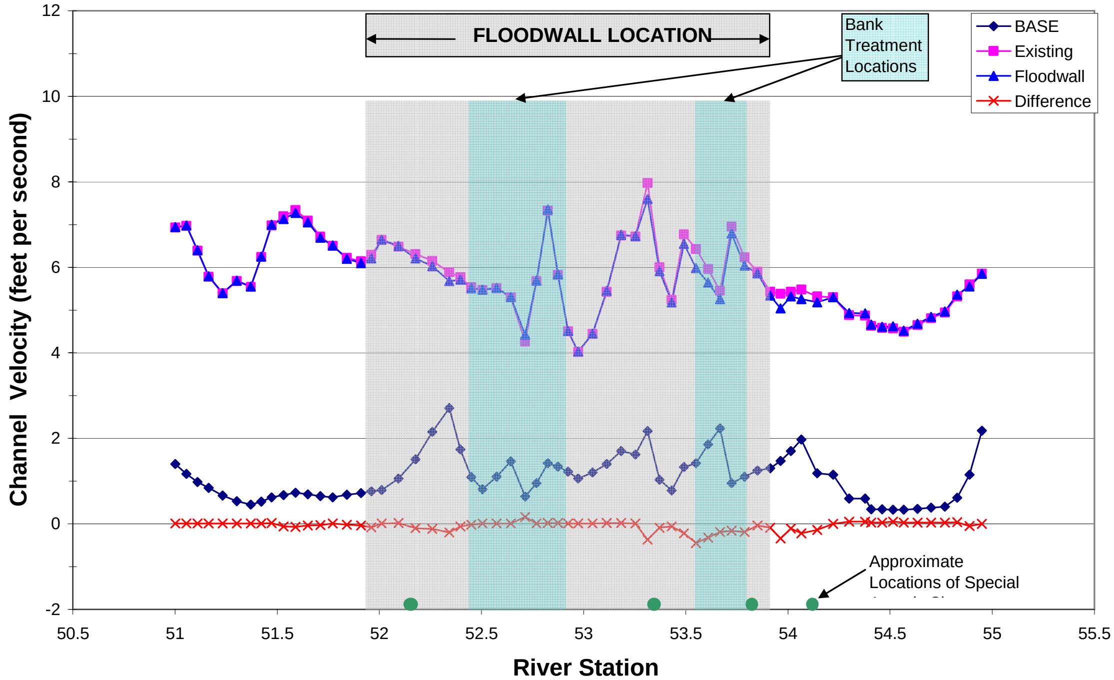


Chart 6-2. Channel Surface Velocities for Levisa Fork 50 Percent Chance (2-Year Frequency) Event within Prestonsburg, Kentucky

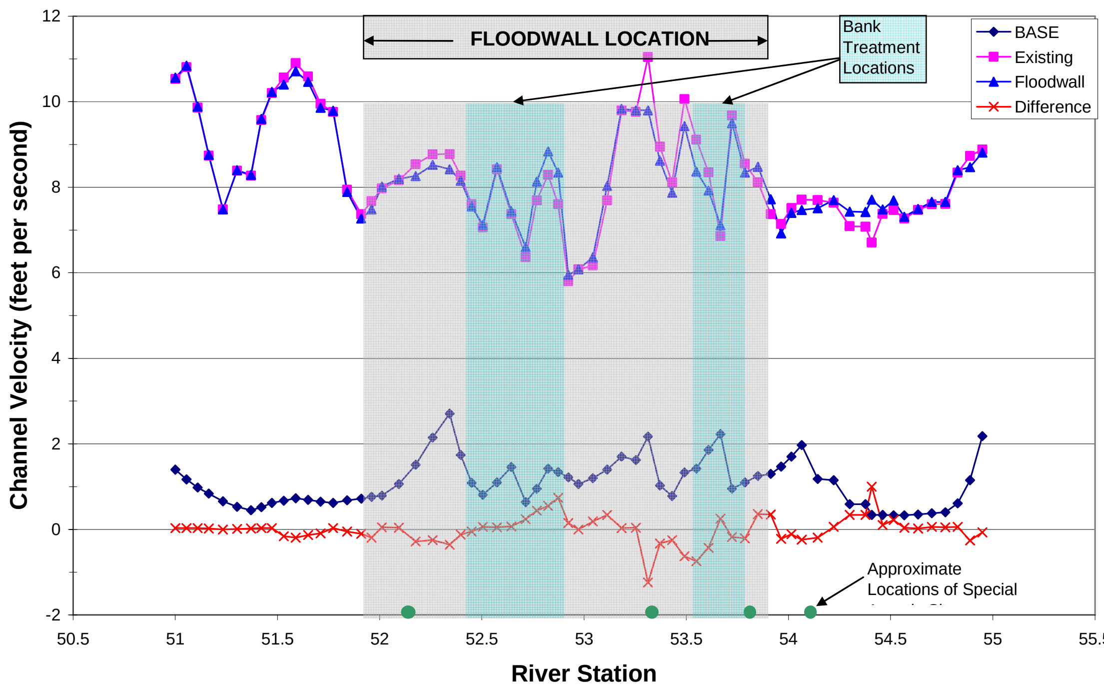


Chart 6-3. Channel Surface Velocities for Levisa Fork 1 Percent Chance (100-Year Frequency) Event within Prestonsburg, Kentucky

The capacity of the stream in the vicinity of the proposed floodwalls to transport bed-load through the reach depends on the stream threshold velocities and on the sizes of particles to be transported. The process can be described by the Hjulstrom Diagram. A Hjulstrom Diagram shows the relationship between water velocity, particle size, erosion, transportation, and deposition. Erosion is the picking up of sedimentary material, transportation is the carrying, and deposition is the dropping of the material. As shown on the diagram, silt and clay particles are generally considered to be less than 0.1 mm in diameter. Sand particles are between 0.1 and 4 mm in diameter. Gravel is generally considered to be between 4 mm and about 64 mm in diameter.

Existing channel surface velocities for base flow, 50 percent chance (2-year frequency) and one percent chance events are shown superimposed on a Hjulstrom Diagram in **Chart 6-4**.

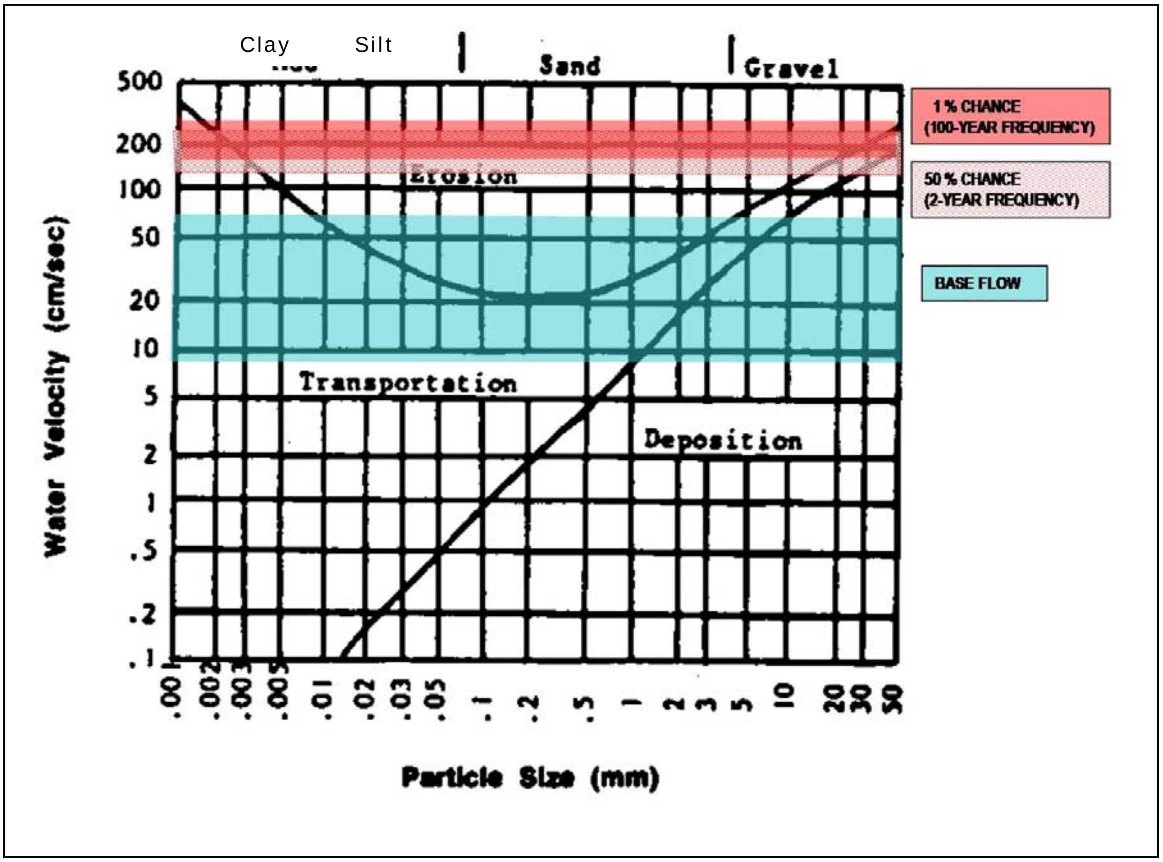


Chart 6-4. Hjulstrom Diagram Showing Range of Channel Surface Velocities for Levisa Fork, River Station 51-55, Prestonsburg, Kentucky

The Hjulstrom Diagram shows that under base channel flow conditions along this reach, particles less than approximately 1mm would be transported and not deposited. Particles between 0.01 and 1 mm would tend to be lifted from the streambed and carried along the Levisa Fork. Some particles between 1 mm and 5 mm (sand) could be lifted and moved, the distance moved depending on their size. Particles heavier than 5 mm (gravel) are not likely to be moved.

With a 50 percent chance storm event, particles less than approximately 25 mm (silt, sand and gravel) would be transported and not deposited along the channel bed and banks. Particles between 0.002 mm and 15 mm would tend to be lifted from the streambed and carried along the Levisa Fork. Some particles larger than 15 mm could be lifted and moved, the distance moved depends on their size. Particles heavier than 50 mm are not likely to be moved.

With a one percent storm event, particles less than approximately 40 mm (silt, sand and gravel) would be transported and not deposited along this reach of the channel. Particles between 0.0015 mm and 20 mm would tend to be lifted from the streambed and carried along the Levisa Fork. Some particles larger than 20 mm could be lifted and moved, the distance moved depending on their size. Particles much larger than 50 mm would not be expected to be lifted and moved.

Some change in the size of larger particles which could be eroded, transported, and deposited are expected as a result of the floodwall and bank stabilization proposed under Alternative Plans 2 and 3. However, these changes are small with respect to the existing channel conditions sediment characteristics and would not be significant. Slightly smaller and slightly larger particles could be displaced due to changes in stream velocity. **Table 6-3** presents the approximate moveable particle size under existing and proposed conditions.

Table 6-3. Approximate Moveable Particle Size for Levisa Fork Storm Events within Prestonsburg Reach (River Station 51 – 55)

		Moveable Particle *	
Stage	Water Elevation (feet)	Existing Conditions (mm)	With Floodwall and Bank Stabilization (mm)
Base Flow	590	.01 – 5	.01 – 5
50 % Chance (2-year frequency)	617	.002 – 40	.0015 – 45
1% Chance	635	.0015 - 50	.0012 – 60
* from Hjulstrom Diagram			

The existing conditions show that lateral bars, pools and riffles within this reach are most likely formed, moved, and transformed episodically under existing reach conditions. Additional impacts to identified aquatic sites from the Proposed Action should be minor; however more effect would be expected along the right bank of the Levisa Fork than along the left bank.

6.7.4.2 Tributary Streams

Trimble Branch: Trimble Branch, north of and adjacent to the First Commonwealth Bank in downtown Prestonsburg, would be directly impacted by either floodwall alternative. This stream emanates from a large culvert and runs approximately 300 feet to its confluence with the Levisa Fork. It is approximately 15 feet wide and an estimated three feet deep. Velocity was estimated at 1 foot per second. The effect of backwater conditions associated with the rise of the Levisa Fork, including deep sedimentation, is evident. The banks are bare up to approximately 15 feet. The heavily vegetated steep upper banks are very unstable. Canopy cover is approximately 50 percent during the growing season. Specific conductivity was not measured, as safe access to the stream was not possible because of the steep, unstable banks. The EII for this reach is calculated at 0.10.

The entire stream length from the culvert to the Levisa Fork would be cleared of all vegetation and the banks stabilized with rip rap. A new culvert would be constructed in conjunction with the upgraded pump station. Once construction is complete, Trimble Branch would flow within the stabilized streambed from the culvert to the Levisa Fork.

May Branch: May Branch is located north of and adjacent to the Prestonsburg High School. The stream emanates from a box culvert that is under a parking lot and road. This culvert was undergoing construction at the time of this assessment. The upper reach of May Branch is significantly different from the lower portion and therefore was assessed separately.

The <u>upper</u> reach of May Branch is approximately 360 feet in length and consists of 80 percent riffle, 5 percent run and 10 percent pool/glide habitat. The stream appears to have been channelized in the past, but has regained some natural dimension, pattern and profile. Water depth ranged from 0.10 feet to 0.55 feet. The stream width ranged from 2 to 6 feet wide. Frequent backwater conditions are likely based on the stream’s appearance, but the lack of significant sediment in this upper portion of the stream indicates an ability to move particles through the system. The velocity was measured at 1 foot per second. There is neither canopy cover nor in-stream cover for this reach. Specific conductivity was measured at 421 µS/cm. The EII for this reach is calculated at 0.19.

The <u>lower</u> reach of May Branch is approximately 374 feet in length, consisting of 75 percent pool and 25 percent run habitat. A number of debris jams consisting of fallen trees and trash were present. The sediment is several feet deep in places and appears to be a permanent condition. Backwater conditions occur because of excessively high water levels when the Levisa Fork rises, which result in sedimentation and high erosion. The banks along this reach are bare, contributing additional sediment. The presence of this deep sedimentation reflects the stream’s inability to move its sediment load through the system. This portion of May Branch has a nearly 100 percent canopy cover during the growing season from the large deciduous trees along the top of the bank. Specific conductivity was measured at 426 µS/cm. The EII for this reach is calculated at 0.18.

Plans for May Branch within the project area include clearing all vegetation, grading the side slopes to a rough trapezoidal channel, and constructing a pumping station. The slopes of the channel would be stabilized with rip-rap and a channel-within-channel streambed would be recreated. Once construction is complete, May Branch would flow within the recreated streambed from the roadway culvert to the toe of the levee, where it would enter the pump station and another culvert. On the riverward side of the levee, water would exit the culvert and flow through a section stabilized with rip rap to the Levisa Fork. On the landward side of the pump station the channel would be used as a ponding area when necessary during high-water events. During normal flow, the May Branch would flow along the bottom of the channel through the pump station culvert to the Levisa Fork. During flood events, the May Branch would be blocked at the pump station and its flow, along with stormwater drainage from inside the floodwall/levee area, would collect in the streambed and be pumped over the wall into the Levisa Fork as necessary. Long-term water quality in the lower section of May Branch would be improved from existing conditions by the placement of rip rap to stabilize the banks. Bank stabilization would also provide a direct, long-term improvement in Levisa Fork water quality by lowering the amount of sediment transported.

May Branch would be periodically impacted by storage of stormwater during larger rainstorms. During these events, water from the Levisa would be higher than the outlet of the pump station causing the temporary closure of the pump outlet structure. This would initiate water storage in the channel area until the runoff reaches a specified storage elevation. Once this elevation is reached, the pumps would be activated in order to maintain the specified elevation. The stored runoff would be released when the Levisa returns to an elevation below the specified flood event. Temporary storage may cause an increase in sedimentation in May Branch, with the potential for contaminants in the stormwater runoff to settle. However, the degree of sedimentation should be small, as most of the sediment would be carried into the Levisa once the stored runoff is released. The pumping station would be considered a point source into the Levisa Fork.

Campus Branch: An unnamed tributary to the Levisa Fork (here called Campus Stream) on the campus of the BSCTC is divided into two sections of significantly different characteristics. This tributary runs along the eastern side of the Community College in Prestonsburg. In the upper section, a concrete trapezoidal channel conveys drainage from a storm drain southeast of the college to a culvert under the entrance road. The Campus Stream emanates from this culvert.

The middle reach of the Campus Stream emanates from the aforementioned culvert under the entrance road to the community college and runs from the culvert approximately 560 feet. The stream has limited dimension, pattern and profile and is still relatively unstable, with bank erosion an issue. This reach of stream has almost total canopy cover during the growing season from large deciduous trees located along the stream banks. Grounds keepers maintain the grass to the water's edge. Specific conductivity was measured at 409 µS/cm. The EII for this reach is calculated at 0.20.

The lower reach of this Campus Stream has no visible boundary; however, the conditions in this reach are vastly different from the upper reach. This reach flows for approximately 461 feet until its confluence with the Levisa Fork. The banks are highly unstable. There is an abundance of sediment gray in color and more than a foot deep in places, most likely a result of evident backwater conditions. The stream bed also contains large amounts of rubble such as large cement slabs, discarded pipes, trees and pruned limbs, yard waste, and man made materials. During the growing season shrubs and deciduous trees provide almost complete canopy cover. Towards its confluence with the Levisa Fork there is a drop in slope of about 32 feet. Specific conductivity was measured at 397 µS/cm near the upstream portion of the reach. No measurements were taken further downstream due to the loss of surface flow. The EII for this reach is calculated at 0.22.

Plans for the Campus Branch within the project area include clearing some of the vegetation along the middle reach, grading the side slopes to a rough trapezoidal channel, and constructing a pump station (see **Figure 7**). The slopes of the channel would be stabilized with rip-rap and a channel-within-channel streambed would be recreated. Once construction is complete, Campus Branch would flow within the recreated streambed from the roadway culvert to the toe of the embankment, where it would enter the pump station and another culvert. On the riverward side of the floodwall embankment, water would exit the culvert and use the existing streambed (lower reach) to the Levisa Fork. On the landward side of the pump station the channel would be used as a ponding area when necessary during high-water events. During normal flow, the Campus Branch would flow along the bottom of the channel through the pump station culvert to the Levisa Fork. During flood events, the Campus Branch would be blocked at the pump station and its flow, along with stormwater drainage from inside the floodwall/levee area, would collect in the streambed and be pumped over the wall into the Levisa Fork as necessary.

Campus Branch would be periodically impacted by storage of stormwater during larger rainstorms. During these events, water from the Levisa Fork would be higher than the outlet of the pump station causing the temporary closure of the pump outlet structure. This would initiate water storage in the channel area until the runoff reaches a specified storage elevation. Once this elevation is reached, the pumps would be activated in order to maintain the specified elevation. The stored runoff would be released when the Levisa Fork returns to an elevation below the specified flood event. Temporary storage may cause an increase in sedimentation in Campus Branch, with the potential for contaminants in the stormwater runoff to settle. However, the degree of sedimentation should be small, as most sediments would be carried into the Levisa once the stored runoff is released. The pumping station would be considered a point source into the Levisa Fork.

Borrow Area Streams: Use of proposed borrow areas has the potential to impact surface water. The type of impacts could include increased sedimentation and erosion from soil disturbance as well as spills or leaks of petroleum products from equipment and vehicles. Excavating the proposed borrow area may generate temporary turbidity and sedimentation impacts within the immediate vicinity of the operation. Potential also exists for surface and groundwater quality impacts from fuels and petroleum products. However, BMPs would be used where appropriate to minimize these effects. A 100-foot buffer between streams and borrow locations would be established prior to beginning soil borrow activities.

Mitigation: BMPs would be used to minimize these impacts. Additional mitigation for stream losses is discussed in **Section 6.8.4.1**. This section discusses potential mitigation for the loss of aquatic resources and habitat associated with stream loss.

6.7.5 Nonstructural (Alternative Plan 4)

Direct Impacts from the nonstructural alternative would be the same as the nonstructural portion of Alternative Plans 2 and 3. No indirect impacts are anticipated.

Mitigation: BMPs would be used to minimize these impacts. Additional mitigation for stream losses is discussed in **Section 6.8.4.1**. This section discusses potential mitigation for the loss of aquatic resources and habitat associated with stream loss.

6.8 Biological Resources

6.8.1 Impact Analysis Methodology

Existing and background information pertaining to biological resources is summarized in **Section 5.9**. This section includes data on local terrestrial and aquatic ecosystems, special habitat areas, vegetation, wildlife resources, special status species, and biological resource management plans and practices. Methods for assessing potential direct and indirect impacts on biological resources generally include the following:

- Comparing the location of such resources in relation to the physical locations of the proposed actions to determine potential direct and indirect impacts on these resources
- Examining the intensity and types of activities proposed in each location to determine the potential for impacts on these resources.

For this analysis, specific potential impacts on biological resources are ranked based on the following:

- Relative importance or value of the resource affected, such as its legal, commercial, recreational, ecological, or scientific value
- The resource's relevant occurrence in the region
- Sensitivity of the resource to the Proposed Action
- Anticipated physical extent of the potential impact
- Anticipated duration of the potential impact's ecological ramifications.

Each action is assessed based on its location and associated activities in relation to the known presence and extent of biological resources on the study area. Sensitivity of biological resources is evaluated based on the following criteria, which are listed in order of importance:

- Designation of the resource by Federal and state resource agencies (e.g., the USACE, state game management agencies, and the USFWS as a high-value or sensitive resource
- Any known or presumed regional sensitivity of the resource
- Any known or presumed local significance of the resource

Direct impacts may be short term or long term, depending on how the biological resources are anticipated to be altered or lost during the course of construction and/or training operations. Examples of direct impacts from project-related construction include grading or mowing of vegetation, filling drainage areas, and losing or interrupting wildlife foraging or nesting areas. Direct impacts for each action under each alternative are defined by expected grading limits for that action. This impact analysis assumes that all biological resources within the area of proposed grading would be lost.

Indirect impacts occur when project-related activities affect biological resources in a manner other than a direct resource loss. For example, indirect impacts from a construction project might last only during construction or for long-term facility operation. Noise, lighting, erosion and siltation, substantial reduction in water quality, dust, and increased human activities within or directly adjacent to sensitive habitat areas are examples of potential indirect impacts. Indirect impacts resulting from the proximity of construction and operation of a proposed action generally are considered to affect habitats and species within 167 feet (50 meters) of the development.

6.8.2 Significance Criteria

Impacts on biological resources were evaluated by determining the sensitivity, significance, or rarity of each resource that would be adversely affected as described above. Significance may be different for each habitat or species and is based on the resource's rarity or sensitivity and on the level of impact that would result from a proposed project.

Most impacts on high sensitivity resources are considered significant, while the determination of significance for impacts on moderate- and low-sensitivity resources depends more on site-specific factors, such as habitat quality and population size, as well as the nature and extent of the anticipated impact. For example, impacts on moderate-value resources could be considered significant if the anticipated impact were to greatly reduce the population or geographic distribution of a species of special concern. Factors considered in determining whether or not an alternative would have a significant impact on biological resources include the extent or degree to which its implementation would result in the following:

- The “take” of a highly sensitive resource, such as a threatened and endangered or special status species (as designated by the USFWS)
- A biological opinion resulting in a jeopardy determination by the USFWS
- Reduction of a sensitive species population, as designated by Federal and state agencies, or of a species with regional and local significance. This can occur with a reduction in numbers, by alteration in behavior, reproduction, or survival, or by loss or disturbance of habitat
- Adverse effect on a wetland or riparian habitat regulated by the local, state, or Federal government, or on another sensitive habitat (e.g., designated critical habitat) identified by the USFWS or in local or regional plans, policies, or regulations
- Interference with the movement of any native resident or migratory wildlife species (including aquatic species) or with established native resident or migratory wildlife corridors
- Alteration or destruction of high to moderate habitat that would prevent biological communities from re-establishing in the area prior to the project
- Introduction, or increase in the prevalence, of undesirable nonnative species
- Long-term loss or impairment of a substantial portion of local habitat (species-dependent)

For this analysis, the determination of the significance of potential impacts to biological resources is based on:

- Relative importance or value (i.e., legal, commercial, recreational, ecological, or scientific) of the affected resource
- Proportion of the resource that would be affected relative to its occurrence in the region
- Sensitivity of the resource to the Proposed Action
- Anticipated physical extent of the potential impact
- Anticipated temporal duration of the potential impact’s ecological ramifications

6.8.3 No Federal Action Alternative (Alternative Plan 1)

6.8.3.1 Aquatic Resources

Implementation of the No Federal Action Alternative would not be likely to directly affect aquatic habitats in the implementation area. However, continued human encroachment on riparian habitats adjacent to the Levisa Fork could indirectly and adversely affect aquatic resources as a result of water quality degradation. Surface water pollutants entering the Levisa Fork from nonpoint sources, straight pipes, and storm water drains would likely continue. Flooding of the Wastewater Treatment Plant would add contaminants into the Levisa Fork. Floatable debris would also be added from various locations during flood events.

6.8.3.2 Terrestrial Resources

No direct change in land cover would result from the No Federal Action Alternative. However, periodic flooding may influence land use changes by discouraging investment, resulting in deterioration of structures and loss of property value for flood-prone areas. Structures located within the floodway may not be replaced after future flood events, leading to eventual increases in the vegetative cover of the corridor and expansion of terrestrial resources.

Under the No Federal Action Alternative, there would be no direct changes in land use in the implementation area. However, human encroachment of riparian areas adjacent to Levisa Fork would likely continue, along with associated habitat loss.

6.8.3.3 Wildlife Resources

Implementation of the No Federal Action Alternative would result in no immediate changes to wildlife resources in the implementation areas. Limited new development in the floodplain would occur, but maintenance of existing development would continue to suppress area wildlife.

6.8.3.4 Threatened and Endangered Species

Implementation of the No Federal Action Alternative would have no direct impact on threatened and endangered species. Continued encroachment of humans on riparian habitats adjacent to Levisa Fork could negatively impact habitat for special status species, including the endangered Indiana bat.

6.8.3.5 Wetlands

Implementation of the No Federal Action Alternative would not be expected to directly impact wetlands. However, continued encroachment of humans on riparian habitats adjacent to Levisa Fork could negatively impact the limited wetland areas found in the Levisa Fork floodplain.

6.8.4 Structural Alternatives (Alternative Plans 2 and 3)

6.8.4.1 Aquatic Resources

Levisa Fork: Construction of either floodwall would have direct, short-term adverse effects on water quality of the **Levisa Fork** during the construction period. Construction of either floodwall would occur over several months. Increased sedimentation would be expected from construction activities. Runoff from fill material could cause a temporary increase in turbidity in adjacent streams and in the immediate area of the Levisa Fork. Spills or leakage of fuel or other petroleum products from construction equipment and vehicles could occur.

Removal of trees within the riparian corridor would occur where the pump stations would be constructed and where bank stabilization is necessary. This could cause increased sunlight reaching the Levisa Fork, which could in turn impact aquatic life.

Work occurring directly in the Levisa Fork includes bank stabilization. A short-term increase in turbidity would be expected. Adverse impacts would be minimized through the use of BMPs.

Direct, long-term beneficial impacts to the Levisa Fork would result from stabilization of the Trimble, May, and Campus Branches. Less erosion and sedimentation would occur from the stabilized banks. Water quality in the Levisa Fork would benefit from the project.

Streams: Impacts to streams were evaluated by comparing the predicted post-project stream conditions with existing conditions.

Short-term impacts would occur to **Trimble Branch, May Branch and Campus Branch** during construction. Impacts include loss of vegetation and canopy cover, grading, and modification of stream banks with rip rap as needed. Aquatic resources in these streams would be lost during construction, but could slowly reestablish once construction is complete. Conditions are expressed in Ecological Integrity Units (EIU), which are a function of a stream's physical and chemical parameters. An assessment of this post-project scenario was conducted to evaluate the change in EIUs from existing conditions. A summary of expected impacts is contained in **Table 6-4.** A worst-case scenario of stream condition was assumed for this evaluation, and the EII for post-project conditions was set at 0.10 for each stream reach impacted. These assumptions would be re-evaluated during the design and permitting process. Should the anticipated stream condition be better, mitigation costs would be lower.

Table 6-4. Summary of Impacts to Streams within the Proposed Project Length

Stream		Existing Conditions			Post-Project			
		Existing Length (ft)	Ecological Integrity Index (EII)	Ecological Integrity Units (EIU)	Condition	Length	Ecological Integrity Index (EII)	Ecological Integrity Units (EIU)
Trimble Branch	Entire Reach	300	0.10	30	Vegetation removal, grading, rip rap	300	0.10	30
	Total EIU Loss/Gain for Stream Reach							0
May Branch	Upper Reach	360	0.19	68.4	Limited vegetation removal, grading	332	0.10	33.2
	Lower Reach	374	0.18	67.3	Vegetation removal, grading, rip rap	80	0.10	8
	Total EIU Loss/Gain for Stream Reach							94.5
Campus Branch (Alternative Plan 2 only)	Upper Channel	922	n/a	0	No change	922	n/a	0
	Middle Reach	560	0.20	112	Limited vegetation removal, grading	489	0.10	48.9
	Lower Reach	461	0.22	101.4	No change	348	0.10	34.8
	Total EIU Loss/Gain for Stream Reach							129.7

Borrow Areas: Use of borrow areas has the potential to impact surface water. The type of impacts could include changes in drainage patterns, increased sedimentation and erosion from soil disturbance, and spills or leaks of petroleum products from equipment and vehicles. Excavating the proposed borrow areas may generate temporary turbidity and sedimentation impacts within the immediate vicinity of the operation. Potential also exists for surface and groundwater quality impacts from fuels and petroleum products. A minimum 50' buffer area would be established between borrow locations and streams on site. In addition, Should the necessary buffer are not be available, a different borrow site would be investigated. BMPs would be used where appropriate to minimize erosion and sedimentation. The borrow area(s) would be revegetated following soil removal.

Nonstructural Area: Minor temporary impacts to the Levisa Fork and tributaries would result from potential increased sedimentation associated with runoff from construction areas as individual properties are acquired and demolished, or as they are floodproofed. BMPs would minimize these impacts. Demolition or modification of these homes could result in a short-term risk to surface water quality and ground water quality as septic systems or straight pipes are closed or modified. Standard BMPs would minimize this risk. Additionally, the USACE requires that all floodproofed structures be connected to a State/County/Public Service Authority (PSA) approved sewage disposal system. If an acceptable system cannot be provided on the lot and an alternative treatment system cannot be provided, the structure would be eligible for floodplain evacuation. Removal of straight pipes from the Levisa Fork floodplain would have a long term beneficial impact on surface and ground water quality. Based on previous nonstructural projects, removal of structures within the floodway of the one percent chance event has resulted in a lowering of the flood profile of the base flood elevation (BFE) and other frequency events by clearing obstructions to the flow. Removal of any structures from the regulatory floodway would have a beneficial effect on surrounding property and facilities. This removal would also reduce floatable debris that can be washed into the stream.

6.8.4.2 Terrestrial Resources

Nonstructural Area: No direct adverse impacts are anticipated to nonstructural area terrestrial resources. Minor disturbances to terrestrial resources in the immediate vicinity of existing structures could occur. Floodplain evacuation and floodproofing would reduce development within the floodplain and would be expected to have a positive impact on riparian habitats that are currently being encroached upon. Moreover, evacuated floodplain areas could be allowed to undergo vegetative succession thereby increasing habitat diversity for many species.

Relocation of residences and businesses to flood safe locations could change land use patterns along the Levisa Fork floodplain. Long term beneficial impacts would likely result as future human habitation of the floodway would be permanently prohibited and the land allowed to revert to its natural condition. Evacuated land within the floodplain could be used for such things as passive recreation or wildlife habitat. However, it is possible that some of the land outside the floodway but within the project area could be filled and redeveloped. These activities would have the potential to increase erosion and thereby stream turbidity. The amount of land use change within the floodplain would depend on the participation rate for this voluntary program.

The amount of clearing and grading upland areas for resettlement is difficult to quantify because it is dependent on participation rates and on individual decisions made by relocated persons. The exact number of structures eligible for relocation compared to those eligible for floodproofing is not known at this time. A portion of the displaced population would relocate to existing vacant structures or leave the area. However, community cohesion in the area is moderately high, and most of the displaced population would be expected to remain in the area. Conversion of forest to accommodate sufficient additional housing is not a significant impact since most of Floyd County is forested. However, forest clearing would have an adverse effect on area wildlife (See Section

6.8.4.3) and there is the potential for Indiana bat habitat could be affected (see Section 6.8.4.4).

Alternative Plan 2: The floodwall would disturb approximately 63 acres of land. Nearly all of this land has been previously disturbed. Approximately 50 acres are currently vegetated (including maintained areas). The total disturbed amount includes temporary use for construction staging and access as well as the permanent floodwall and access footprint (see **Table 6-5**). Impacts to riparian forest habitat were evaluated by comparing the predicted post-project terrestrial habitat conditions with the anticipated terrestrial habitat losses associated with floodwall construction. Terrestrial habitat evaluations prepared as part of the Ecological Summary for the Floyd County Section 202 Flood Damage Reduction Project (AMEC 2006) provide detailed information on how Habitat Suitability Indexes (HSI) were calculated for current conditions (loss of habitat), and post conditions (preservation and creation of riparian forest habitat).

Table 6-5. Land Cover Impacts for Alternative Plan 2 (Long Wall Ending at BSCTC)

Existing Land Cover	Within Construction Work Limit		Within Construction Limits Riverward of Structural Footprint and Maintenance Buffer			Riverward of Construction Work Limits			
	Disturbance (acres)	Bottomland Forest Habitat Units Lost *	Disturbance (acres)	Bottomland Forest Created (acres)	Bottomland Forest Habitat Units Created	Existing Land Cover (acres)	Bottomland Forest Created (acres)	Bottomland Forest Habitat Units Created	Bottomland Forest Habitat Units Conserved
Disturbed	3.63	-	0.01	0.01	-	-	-	-	-
Paved	9.96	-	0.45	-	-	0.06	-	-	-
Wetland	0.06	-	-	-	-	-	-	-	-
Riparian	10.9	6.11	3.73	3.73	2.98	7.00	-	-	4.41
Maintained	38.7	-	10.35	10.35	8.28	3.11	3.11	2.49	-
TOTAL	**63.30**	**6.11**	**14.54**	**14.09**	**11.26**	**10.22**	**3.11**	**2.49**	**4.41**

* HSI = 0.56 for loss, 0.63 for preservation, 0.8 for creation

Vegetation directly in the alignment of the floodwall would be permanently removed and would no longer provide habitat for terrestrial organisms. In addition, an approximate 10-foot access buffer would be created along the riverward side of the floodwall. This habitat would be permanently converted to maintain a treeless environment along the concrete floodwall. Armored toe protection between floodwall Stations 57+00 and 62+00 (between the Commonwealth bank and the SR 114 bridge in downtown Prestonsburg) and between floodwall Stations 105+00 and 124+00 (between Dickerson Street and Porter Lane) Vegetation would be removed from the lower slope, and slopes would be graded prior to stone placement. A geotextile fabric should be selected and placed on the slope to provide separation between slope soils and strength to the stone armoring. The armored toe will be approximately ten feet wide and five feet high and will be founded about two feet below the normal river level. Vegetation will be allowed to naturally establish over this armored toe (for aquatic impact discussion, see Section 6.8).

Some of the upper bank reaches within the CWL would have stone slope protection along the floodwall (shown in Figures 4 and 5). These areas will be kept free of vegetation and are included in the land cover calculations in Table 6-5.

The riparian corridor riverward of the CWL would not be cleared. However, acquisition of property would extend to the edge of the Levisa Fork along the alignment, except in areas where the riparian corridor is already owned by the County.

Disturbed areas outside the structural footprint would be revegetated following construction as described in **Chapter 4**. Disturbed areas landward of the floodwall would be restored to at least their current condition in consultation with Floyd County and the City of Prestonsburg regarding the land's intended use. Due to the limited acreage converted and the relatively low quality of the existing habitat, this impact is not considered significant.

The acquired land between the floodwall access buffer and the Levisa Fork would be permanently precluded from development with a deed restriction and would return to passive use, providing an overall beneficial impact. Disturbed areas and currently nonforested areas riverward of the grass buffer would be planted and seeded with native tree and shrub species to enhance the existing riparian corridor.

The proposed project would be expected to have an overall beneficial impact to terrestrial resources. Although approximately 6.11 habitat units of existing bottomland forest would be cleared for construction of the floodwall, these losses would be offset by a gain of 18.16 habitat units of bottomland forest, resulting from the preservation and creation of riparian forest habitat riverward of the structure. Revegetation of the area would help to re-establish wildlife habitat, stabilize soil, and create more valuable habitat by planting native species of grasses, wildflowers, shrubs, and trees.

Alternative Plan 3: The floodwall would disturb approximately 39 acres of land. Nearly all of this land has been previously disturbed. Approximately 29 acres are currently vegetated (including maintained areas). The total disturbed amount includes temporary use for construction staging and access as well as the permanent floodwall and access footprint (see **Table 6-6**). Impacts would be similar in nature to those for Alternative Plan 2. However, this alternative would require only 3.98 habitat units of bottomland forest to be lost as a result of clearing for construction of the floodwall. This alternative would have a slightly lower impact on riparian forest habitat in the project area.

Table 6-6. Land Cover Impacts for Alternative Plan 3 (Long Wall Ending at Blackbottom)

Existing Land Cover	Within Construction Work Limit		Within Construction Limits Riverward of Structural Footprint and Maintenance Buffer			Riverward of Construction Work Limits			
	Disturbance (acres)	Bottom-land Forest Habitat Units Lost *	Disturbance (acres)	Bottom-land Forest Created (acres)	Bottom-land Forest Habitat Units Created	Existing Land Cover (acres)	Bottom-land Forest Created (acres)	Bottom-land Forest Habitat Units Created	Bottom-land Forest Habitat Units Con-served
Disturbed	3.39	-	1.80	1.80	1.44	-	-	-	-
Paved	7.08	-	0.33	-	-	0.06	-	-	-
Wetland	-	-	-	0.00	-	-	-	-	-
Riparian	7.11	3.98	2.85	2.85	2.28	2.22	-	-	1.40
Maintained	21.8	-	14.30	14.30	11.44	1.81	1.81	1.45	-
TOTAL	**39.35**	**3.98**	**19.28**	**18.95**	**15.16**	**4.09**	**1.81**	**1.45**	**1.40**

* HSI = 0.56 for loss, 0.63 for preservation, 0.8 for creation

Borrow Areas: Impacts to terrestrial resources in soil borrow areas would be expected to be similar in nature to the other cleared acres previously discussed. Due to the limited acreage converted and the relatively low quality of the existing habitat, this impact is not considered significant. However, disturbance of vegetation could facilitate the spread of invasive species. Transfer of soil from borrow areas could result in the transfer of invasive species, if any are present at borrow locations. Invasive species can out-compete native vegetation; therefore management is necessary to prevent adverse impacts to terrestrial resources in the project area. Eradication of existing invasive species at the borrow area prior to excavation would help reduce the chance of spreading these species to the floodwall area. Removal of topsoil prior to excavation and respreading of that topsoil after borrowing would also confine most invasives to the borrow area.

Indirect Impacts: The amount of clearing and grading upland areas for resettlement as a result of voluntary floodplain evacuation is difficult to quantify because it is dependent on participation rates and on individual decisions made by relocated persons. The exact number of structures eligible for relocation compared to those eligible for floodproofing is not known at this time. A portion of the displaced population would relocate to the approximately 1,670 existing vacant structures within Floyd County or leave the area. However, community cohesion in the area is moderately high, and most of the displaced population would be expected to remain in the area. Conversion of upland forest to accommodate sufficient additional housing would impact terrestrial habitat. The expected amount of land cleared impacted would be 1.5 – 2 times greater than the equivalent amount vacated. This is because of the differences in grade between floodplain and upland. Additional land would typically be cleared for access roads and utilities when new neighborhoods are constructed.

6.8.4.3 Wildlife Resources

Terrestrial wildlife within these areas would sustain direct impacts as a result of land clearing and construction of the proposed project. Relatively mobile animals (i.e. deer, birds, and rabbits) would be expected to evacuate the project area during construction activities. These species would be expected to relocate to adjacent undeveloped areas. This could have an impact on adjacent forest communities due to the potential increase of wildlife in those areas. However, this impact is likely insignificant because of the relatively small area that would be cleared during construction activities. In addition, much of the implementation area is adjacent to developed areas and would not be expected to contain a diverse and/or abundant wildlife population. Less mobile animals (e.g., salamanders, reptiles, turtles) and burrowing species within the proposed implementation area would be expected to be negatively impacted by construction activities. For these species, direct mortality could occur during the actual construction event or ultimately result from habitat alteration. Either floodwall would preclude passage of some wildlife species between the riparian and upland areas.

The spread of invasive species (e.g., kudzu) within the project area would have an adverse impact on wildlife habitat, as habitat could be reduced. See Section 4.7.5.3 and 6.8.6.3 for the invasive species management plan.

Disturbances caused by construction on the project site may affect wildlife in adjacent habitats by disrupting feeding, breeding, and nesting activities. Habitats on and surrounding the site may be used for breeding by migrant and resident songbirds. Increased noise levels created by operation of heavy machinery could cause birds to abandon their nests and may temporarily displace wildlife during construction. Once construction activities are complete, wildlife would likely resume use of the area. Long-term impacts to wildlife resources would be positive, since the existing riparian corridor would be enhanced.

Impacts to wildlife in borrow areas are not expected to be significant because the habitat quality in these areas is marginal. Borrow areas may provide limited habitat for the Indiana bat. However, because of the large amount of forest in the immediate area and region, and because clearing would be restricted to between November 15 and March 31, the loss of these sites would not be considered to be a significant impact to the Indiana bat or to other wildlife.

No direct adverse impacts to wildlife would be expected in nonstructural areas. Floodplain evacuation would reduce development within the floodplain and would be expected to have a positive impact on riparian habitats that are currently being encroached upon. This would have a positive impact on wildlife species that utilize riparian habitats. Moreover, many evacuated floodplain areas would revert to wildlife habitat.

6.8.4.4 Threatened and Endangered Species

Because the implementation areas potentially contain special status species, there is a potential for these species to be directly impacted by construction of either floodwall alternative. The proposed project area provides summer roosting and foraging habitat for the Indiana bat (Libby et al, 2004). Therefore, this species could be adversely affected by implementation of the structural project alternative.

Voluntary floodplain evacuation would reduce development within the floodplain and would be expected to have a positive impact on riparian habitats that are currently being encroached upon. This would potentially improve habitats for some special status species.

6.8.4.5 Wetlands

Approximately 0.06 acres of a 0.4-acre palustrine emergent wetland are within the construction work limits of Alternative Plan 2. The wetland is in part of the area planned for interior drainage collection during flood events. No adverse effect to this wetland is anticipated. No excavation, grading, or equipment staging is planned for this area. Periodic collection of interior drainage in this area may enhance of this wetland.

No wetlands were identified in the proposed borrow areas. No wetland impacts are anticipated in nonstructural areas. No indirect impacts are anticipated.

6.8.5 Nonstructural Alternative (Alternative Plan 4)

Prestonsburg would be part of the nonstructural program, with individual structures evaluated for voluntary relocation or floodproofing. Minor, short-term direct impacts would be limited to individual parcels where nonstructural measures would occur, and would be similar in nature to the nonstructural portion of Alternative Plans 2 and 3.

No impacts to borrow areas would occur, as no floodwall construction would take place.

Indirect Impacts: The amount of clearing and grading upland areas for resettlement as a result of voluntary floodplain evacuation is difficult to quantify because it is dependent on participation rates and on individual decisions made by relocated persons. The exact number of structures eligible for relocation compared to those eligible for floodproofing is not known at this time. Upland impacts from relocation would most likely be larger than from Alternative Plans 2 or 3 because more households would be in the nonstructural program. A portion of the displaced population would relocate to the approximately 1,670 existing vacant structures within Floyd County or leave the area. However, community cohesion in the area is moderately high, and most of the displaced population would be expected to remain in the area. Conversion of upland forest to accommodate sufficient additional housing would impact terrestrial habitat. The expected amount of land cleared impacted would be 1.5 – 2 times greater than the equivalent amount vacated. This is because of the differences in grade between floodplain and upland. Additional land would typically be cleared for access roads and utilities when new neighborhoods are constructed.

6.8.5.1 Aquatic Resources

Implementation of the nonstructural alternative would have a minor short-term adverse impact on aquatic habitats of Levisa Fork and its tributaries. The potential to impact aquatic habitats would be from fuels and petroleum products and is similar to the structural alternatives but smaller in scale, and more distributed over time. Long-term impacts would be beneficial, as fewer human impact would occur on the Levisa Fork floodplain (such as water pollution, floatable debris, contaminated runoff).

6.8.5.2 Terrestrial Resources

Alternative Plan 4, as described in Chapter 4, includes voluntary nonstructural measures throughout the entire the Floyd County implementation area, including the City of Prestonsburg.

The City of Prestonsburg would be part of the nonstructural program, with individual structures evaluated for voluntary relocation or floodproofing. Impacts to land use in these areas would be similar to the rest of the implementation area, as open land would replace acquired residences and businesses that elected to participate in the voluntary relocation program. The pattern of land use could change depending on the relocation participation rate. However, given the location and value of the land within Prestonsburg, all evacuated land would be expected to be reused for an appropriate land use protected from flood damages. Vacant land would not be a “highest and best use” within the city.

No impacts to borrow areas would occur, as no levee construction would take place.

Impacts in the balance of Floyd County would be similar to the nonstructural portion of Alternative Plans 2 and 3.

6.8.5.3 Wildlife Resources

No direct adverse impacts to terrestrial wildlife would be expected. Voluntary floodplain evacuation would have a positive impact on riparian habitats that are currently being encroached upon; this would have a positive impact on wildlife species that utilize riparian habitats.

6.8.5.4 Threatened and Endangered Species

Voluntary floodplain evacuation would be expected to have a positive impact on riparian habitats that are currently being encroached upon. This would potentially improve habitats for some special status species.

6.8.5.5 Wetlands

Implementation of Alternative Plan 4 would not be expected to impact wetlands.

6.8.6 Ecological Mitigation Plan for Structural Alternatives

6.8.6.1 Aquatic Resources

Based on consultation with regulatory agencies, compensatory mitigation is needed for impacts to the Levisa Fork and to May and Campus Branches. For Trimble Branch, no net loss of EIUs is anticipated, and therefore no mitigation is needed. Alternative mitigation strategies evaluated include mitigation-in-place, off-site mitigation, and in-lieu fee compensation to KDFWR. Off-site mitigation for the tributaries was investigated but was not feasible. No other tributaries within or adjacent to the project area were identified to have mitigation potential. On the suggestion of regulatory agencies, field staff visited Fishtrap Lake and looked at various tributaries to see if they would provide suitable mitigation sites using stream restoration/enhancement. None of the streams reviewed were suitable mitigation sites.

Both mitigation-in-place and in-lieu fee compensation are still being considered for the Levisa Fork. The mitigation-in-place option for the Levisa Fork would incorporate measures to improve aquatic habitat in the areas disturbed by streambank stabilization. A detailed mitigation plan will be included in the Final EIS.

In-lieu fee compensation is proposed for tributary streams affected. Based on the agreement concerning in-lieu mitigation fees between KDFWR and USACE, compensatory mitigation through the payment of in-lieu fees is available when project impacts can not be avoided, minimized, or mitigated on site. In-lieu fee recipients use the money to identify appropriate stream and wetland restoration opportunities in Kentucky with the intent to conduct mitigation projects as close to the impacted site as possible. In-lieu fees were estimated with the Eastern Kentucky Stream Assessment Protocol (EKSAP) calculator using the in-lieu compensatory mitigation ratio for perennial streams.

- For May Branch, approximately 28 feet and 294 feet of the upper and lower reach (respectively) will be culverted, which represents a complete loss of 322 feet of existing stream length. The remaining stream length (approximately 412 feet) is anticipated to have a reduction in Ecological Integrity (see Table 6-4). For both reaches, the EKSAP-calculated mitigation ratio ranged between 1.5 and 1.67. The estimated cost of in-lieu fee compensation would be $65,367 for the upper reach and $72,612 for the lower reach.
- For Campus Branch (Alternative Plan 2 only), approximately 71 feet and 113 feet of the middle and lower reach (respectively) will be culverted, which represents a complete loss of 184 feet of existing stream length. The remaining stream length (approximately 837 feet) is anticipated to have a reduction in Ecological Integrity (see Table 6-4). For both reaches, the EKSAP-calculated mitigation ratio ranged between 1.5 and 1.73. The estimated cost of in-lieu fee compensation would be $102,398 for the upper reach and $87,597 for the lower reach.

The total in-lieu fee compensatory mitigation cost for tributary streams would be approximately $327,974 for Alternative Plan 2 and $137, 979 for Alternative Plan 3. The intent is to conduct mitigation projects as close to the impact site as possible. The policy of the USACE and the KDFWR is that mitigation projects occur in the same river basin and ecological region. For example, an impact in the Big Sandy River Basin in the Appalachian region of Kentucky would be mitigated by an in lieu fee project in this same basin and region.

6.8.6.2 Terrestrial Resources

This riparian corridor replanting plan was developed in consultation with regulatory agencies to ensure that impacts from clearing are compensated for in the post-project condition.

Vegetation riverward of the CWL would not be cleared. However, acquisition of property would extend to the edge of the Levisa Fork along the alignment, unless the riparian corridor in an area is already publicly owned. Revegetation of disturbed areas with native species of grasses, wildflowers, shrubs, and trees would follow construction. An approximate 8-foot buffer would be created along the riverward side of the floodwall to maintain a treeless environment along the structure. Disturbed areas and currently non-forested areas riverward of the buffer would be planted and seeded with native tree and shrub species to return the area to passive use and enhance the existing riparian corridor. Landward of the floodwall, disturbed areas would be restored to at least their current condition in consultation with Floyd County and the City of Prestonsburg regarding the land's intended use.

A list of riparian species for revegetation based on field guides, agency consultation, and field reconnaissance is presented in **Table 6-7**. Box elder and silver maple are highly abundant throughout the watershed, based on literature research and field surveys. These species may be planted, but are expected to establish themselves naturally. Revegetation using the suggested species list would enhance habitat quality of the riparian corridors along the floodwalls through the establishment of hard mast species and greater species diversity. Northern red oak (*Quercus rubra*), black walnut, yellow buckeye, and shellbark hickory (*Carya laciniosa*) would be planted only on the upper terrace of the Levisa Fork riparian corridor to increase survival rate.

Black walnut trees naturally contain a chemical called juglone which can inhibit the growth of some plants (Morton Arboretum, 2006). Most of the trees and shrubs plants recommended for revegetation are tolerant of juglone, as indicated in Table 6.7. To minimize potential for Black Walnut Toxicity, revegetation layout plans will be prepared by a landscape planner with special notes as needed.

Table 6-7. Proposed Riparian Species for Revegetation

Trees	
Black Cherry (T)	*Prunus serotina*
Black Willow(T)	*Salix nigra*
Black Walnut *	*Juglans nigra*
Green Ash	*Fraxinus pennsylvanica*
Northern Red Oak* (T)	*Quercus rubra*
Red Maple (T)	*Acer rubrum*
River Birch (T)	*Betula nigra*
Shellbark Hickory* (T)	*Carya laciniosa*
Sycamore (T)	*Platanus occidentalis*
Silver Maple (S)	*Acer saccharinum*
Yellow Buckeye*	*Aesculus octandra*
Tuliptree	*Liriodendron tulipifera*
Shrubs	
American Plum (T)	*Prunus americana*
Elderberry (T)	*Sambucus canadensis*
Raspberry (T)	*Rubus spp.*
River Cane	*Arundinaria gigantea*
Sassafras (T)	*Sassafras albinum*
Spicebush (T)	*Lindera benzoin*
Herbaceous Plants	
Downy Wild rye	*Elymus villosus*
Fowl Manna Grass	*Glyceria striata*
Riverbank Wild rye	*Elymus riparius*
River Oats (also called Spangle grass and Indian woodoats)	*Chasmanthium latifolium*
Wild rye	*Elymus virginicus*
Yellow Wingstem	*Verbesina alternafolia*

* Hard mast species
(T) Tolerant of Black Walnut Toxicity (Morton Arboretum, 2006)
(S) Sensitive to Black Walnut Toxicity (Morton Arboretum, 2006)

6.8.6.3 Invasive Species Management Plan

Invasive and exotic species are defined as “nonnative species whose introduction does or is likely to cause economic or environmental harm or harm to human health”. These species have the ability to reduce biological diversity and impede natural succession and reforestation. Management of invasive species in the project area after construction and during the revegetation period is critical to allow this area to revegetate and to prevent the loss of riparian forest habitat riverward of the floodwall. Typical invasive species within the area are listed in **Table 6-8**.

Table 6-8. Invasive Species within Riparian Forest Habitat in Southeastern Kentucky

Common Name	Scientific Name	KY-EPPC Threat level
Birdsfoot trefoil	*Lotus corniculata*	
Common chickweed	*Stellaria media*	Significant
European black alder	*Almus glunnosa*	
Ground Ivy	*Glechoma hederacea*	Significant
Indiana strawberry	*Duschesnea indica*	Lesser
Japanese honeysuckle	*Lonicera japonica*	**Severe**
Japanese hops	*Humulus japonicus*	
Japanese knotweed	*Polygonum cuspidatum*	**Severe**
Multiflora rose	*Rosa multiflora*	**Severe**
Nepalese browntop	*Microstegium vimineum*	**Severe**
Perrywinkle	*Vinca minor*	Significant
Privet	*Ligustrum vulgare*	**Severe**
Chinese empress-tree	*Paulownia tomentosa*	Significant
Winter Creeper	*Euonymous fortunei*	**Severe**

Source: Eco-Tech (2001); Kentucky Exotic Pest Plant Council (KY-EPPC) (2000)

During site reconnaissance of the general area, Japanese honeysuckle, Japanese hops, Japanese knotweed, mulitflora rose, Nepalese stilt grass, and privet were identified in the riparian corridor. These species could pose a problem by invading cleared areas and making revegetation with native species more difficult.

The goal of managing invasive species within the project area is prevention and early detection. Early detection helps control invasive species to a level that is not detrimental to the riparian corridor habitat quality. Special consideration for exotic species with a severe threat of displacing native vegetation would be made. A general invasive species-monitoring plan would be devised for the control of these species riverward of the structural measures.

Should kudzu be encountered in borrow areas or near the construction work limits, a more detailed monitoring and eradication plan would be devised for kudzu. Kudzu can be highly disruptive to forest habitat by covering native species and eventually displacing them. This severe threat species was not observed within the construction work limits; however, it could be introduced into these project areas during soil excavation in borrow areas and transported if necessary measures are not taken. Detailed monitoring and maintenance plans, including annual reporting requirements, would be documented in the project Operation and Maintenance manual.

6.8.6.4 Threatened and Endangered Species

The Corps, in consultation with the USFWS and KDFWR, plans to conduct needed clearing activities during winter months (November 15 through March 31) to avoid potential direct impact (i.e., injury) to the Indiana bat. If tree removal would be required outside of this time frame, the Corps will coordinate with the USFWS and KDFWR to ensure the necessary precautions are implemented to avoid impact to the Indiana Bat.

6.8.6.5 Wetlands

No adverse effect to wetlands is anticipated. During project implementation, BMPs would be used to minimize the potential for release of fuels and other petroleum products.

Should the project plans change to adversely affect wetlands, additional documentation and permitting would be required. A formal wetland survey and delineation would be completed, with formal wetland boundaries used to establish buffer zones to avoid impacts if possible. A detailed mitigation plan, if needed, would be prepared.

6.9 Cultural Resources

6.9.1 Impact Analysis Methodology

Existing and background cultural resource information for the study areas is summarized in **Section 5.10**. Two primary forms of cultural resources exist at applicable geographic locales: belowground archaeological resources (prehistoric and historic) and aboveground historic structural/architectural resources. Each of the considered project alternatives are reviewed and evaluated to identify potential impacts (positive or negative) relative to existing conditions. Methods for assessing potential impacts to cultural resources generally include:

- A comparison of the location of such resources in relation to the physical locations of any proposed actions to determine potential direct and indirect impacts to these resources
- An examination of activity types proposed in each location to determine the potential for impacts to these resources

6.9.2 Significance Criteria

As described in **Section 5.10**, cultural resources are subject to review under Federal and state laws and regulations. Section 106 of the NHPA of 1966 empowers the ACHP to comment on federally initiated, licensed, or permitted projects and consider any effects its actions would have on significant historic properties, such as archaeological sites, historic districts, historic structures, or objects that are listed on, or are eligible for listing on, the NR of Historic Places. In consultation with the ACHP, the SHPO, and other consulting parties, the Federal agency should assess the adverse effects that the Proposed Action will have on an individual historic property, as well as the cumulative effects of multiple actions on a historic property or on multiple historic properties.

Factors determining the significance of impacts on cultural resources are derived from federal laws and regulations regarding cultural resources protection. Section 106 and its implementing regulations state that an undertaking has an effect on a historic property (i.e., NRHP-eligible resource) when that undertaking may alter characteristics of the property that qualify it for listing on the NRHP. An undertaking is considered to have an adverse effect on a historic property when the effect diminishes the integrity of the property's location, design, setting, materials, workmanship, or association. Adverse effects include, but are not limited to:

- Physical destruction, damage, or alteration of all or part of the property
- Isolation of the property or alteration of property setting's character when that character contributes to the property's qualifications for listing on the NRHP
- Introduction of visual, audible, or atmospheric elements that are out of character with the property, or the introduction of changes that may alter that property's setting
- Neglect of a property, resulting in its deterioration or destruction
- Transfer, lease, or sale of a property to Federal and non-Federal entities without adequate provisions to protect its historic integrity.

Under the NHPA, only cultural resources that are deemed significant according to NRHP criteria warrant consideration with regard to adverse impacts resulting from implementation of a proposed action. Those resources that were not fully assessed for NRHP eligibility, but *may be eligible* based on preliminary investigations, are treated as if they *are NRHP eligible* for management purposes, pending further evaluation. Generally, cultural resources must be more than 50 years old to receive protection under Federal laws. However, more recent structures, such as Cold War-era resources, may warrant protection if they have the potential to gain significance in the future (36 CFR 60.4).

The nature of what qualifies as an adverse effect on an historic property varies from property to property based on the unique attributes that define that property's historic significance. Such impacts cannot be easily quantified in terms of degree or intensity. The level at which a particular activity results in an adverse impact to a significant historic property must be determined on a case-by-case basis through consultation with the Federal agency, the SHPO, and the ACHP. Such consideration is also applied to cumulative impacts on individual historic properties and on multiple historic properties.

6.9.3 No Federal Action (Alternative Plan 1)

The No Federal Action Alternative would have no impact on cultural resources in Floyd County.

6.9.4 Structural (Alternative Plans 2 and 3)

The USACE has previously determined that the proposed project would affect properties included in or eligible for inclusion in the NR and has consulted with the ACHP and the

Kentucky SHPO, pursuant to the regulations (36 CFR Part 800) implementing Section 106 of the NHPA. Cultural resources, including archaeological resources and historic/architectural resources, could be directly and indirectly affected by the proposed project. Based on the history of the area summarized in **Section 5.10**, the proximity of the Levisa Fork, and the number of existing historic sites and artifacts found during previous investigations, a relatively high potential exists that previously unrecorded archaeological sites would be identified during site investigations.

Nonstructural Areas: The nonstructural program has the potential to impact cultural resources within Floyd County. During field investigations, some properties eligible for voluntary evacuation or floodproofing could be determined to be eligible for listing on the NRHP. In addition, archaeological resources could be identified on properties eligible for the nonstructural programs.

Structural Areas: Several structures listed on the NRHP, as well as the Front Street Historic District, are within the general Prestonsburg structural area. The majority of these structures are in areas where flood control measures include raising the street centerline or other non-floodwall modifications (see **Figure 4-7**). There is some potential that activity within NRHP boundaries would be required. These NRHP listed properties include:

- Front Street Historic District
- GD Callahan House
- May-Fitzpatrick House
- May-Latta House
- B.F. Combs House
- Harkins Law Office Building
- Former U.S. Post Office
- Joseph D Harkins House
- Methodist Episcopal Church (also known as Prestonsburg First United Methodist Church)
- West Prestonsburg Bridge

Borrow Areas: There is some potential for cultural resources to exist within the three potential borrow areas. Cultural resource field surveys would be conducted prior to final borrow area selection.

Mitigation: To ensure full consideration of potential impact to cultural resources, a Programmatic Agreement has been developed between the USACE, Huntington District and the Kentucky SHPO regarding this and other Section 202 Flood Reduction activities within the Levisa Fork basin. The agreement covers activities in Pike, Johnson, Lawrence counties as well as Floyd County, Kentucky. This Programmatic Agreement, dated March 2003 is included in Annex A of this document.

The Programmatic Agreement sets forth the agreed-upon procedures the USACE would follow prior to implementation of a selected alternative in order to satisfy USACE's Section 106 responsibilities for all individual project undertakings. These procedures take full account of the methodology and significance criteria described in Sections 6.9.1 and 6.9.2.

6.9.5 Nonstructural (Alternative Plan 4)

The nonstructural program has the potential to impact cultural resources within Prestonsburg as well as the larger Floyd County area. During field investigations, some properties eligible for voluntary evacuation or floodproofing could be determined to be eligible for listing on the NRHP. In addition, archaeological resources could be identified on properties eligible for the nonstructural programs.

None of the NRHP listed properties in Prestonsburg are listed as eligible for the flood damage reduction program, as they have first-floor elevations above the one percent chance event elevation. With the nonstructural program, these structures would not be directly impacted. An indirect impact could occur if other properties in the area were to be removed or modified as part of the nonstructural program.

The Programmatic Agreement sets forth the agreed-upon procedures the USACE would follow prior to implementation of a selected alternative in order to satisfy USACE's Section 106 responsibilities for all individual project undertakings.

6.10 Socioeconomic Resources and Environmental Justice

6.10.1 Impact Analysis Methodology

Background information pertaining to socioeconomic characteristics for the study areas was summarized and presented in **Section 5.11**. This section evaluates potential impacts to the location and distribution of the population, and changes in the demand on, or capacity of, local public services, which include local fire and police services, medical services, and schools. Each of the considered project components are reviewed and evaluated to identify potential impacts (positive or negative) relative to existing socioeconomic conditions.

This analysis also includes an assessment of anticipated changes to the protection of children. To evaluate whether or not children could encounter disproportionate environmental health or safety effects, the area's under-18 population was computed. The potential environmental health and public safety risks identified for each alternative were then evaluated for proximity to child populations.

To determine whether or not low-income and minority populations could be disproportionately affected by the alternatives, the proportion of low-income people and minorities in the project area were identified. If high percentages of low-income and minority populations were identified, their potential for displacement, loss of income or employment, and adverse health or environmental conditions to occur, as the result of construction or operational activities, was assessed.

6.10.2 Significance Criteria

Factors considered in determining whether or not an alternative would have a significant impact on socioeconomics include the extent or degree to which its implementation would result in any of the following:

- Change in the unemployment rate for applicable counties
- Change in total income
- Change in business volume
- Change in the local housing market and vacancy rates, particularly with respect to the availability of affordable housing
- Disproportionate endangerment to children in or near project areas
- Disproportionate adverse effect on low-income or minority populations

The level of anticipated socioeconomic impact resultant from the implementation of an alternative was determined based on the anticipated magnitude of the impact, as it would affect effect each socioeconomic issue area. Thresholds of significance for each socioeconomic issue area are as follows:

- Population: Impacts are considered neither adverse nor beneficial in isolation. However, any population impacts may have ramifications for other environmental issues. The significance of these other impacts is defined in relevant sections of this analysis, as appropriate.
- Housing: Any measurable *reduction* in vacancy rates or *increase* in prevailing rental rates or home prices is considered significant and adverse for prospective renters and homebuyers. Any measurable *increase* in vacancy rates or *reductions* in rental rates or home prices is considered adverse for landlords and home sellers.
- Employment: Positive changes in employment are considered beneficial. Any measurable increase in the unemployment rate is considered significant and adverse.
- Income: Positive changes in income are considered beneficial. Any anticipated reduction in total income is considered significant and adverse.
- Community Services and Facilities: Impacts are considered significant if existing community services and facilities could not effectively accommodate projected or anticipated demands that result from an action.
- Recreational Facilities: Impacts are considered significant if existing recreational facilities would be eliminated or reduced as the result of a proposed action or alternative, or would not be sufficient to accommodate anticipated demand.
- Protection of Children: Impacts are considered significant and adverse if areas of high concentrations of children (e.g., schools, childcare centers, family housing) in areas on or near a study area would be endangered by an action.

- Low-Income and Minority Populations: Impacts are considered significant and adverse if areas with high concentrations of low-income or minority individuals will be negatively affected by an action.

Factors considered in determining whether or not an alternative would have a significant impact on environmental justice included the extent or degree to which its implementation would result in the change of any social, economic, physical, environmental, or health conditions so as to disproportionately affect any low-income or minority group.

The level of anticipated environmental justice impact resulting from the implementation of an action was determined based on the anticipated magnitude of the impact, as it would affect any particular low-income or minority group. All social, economic, physical, environmental, or health impacts that disproportionately affect any particular low-income or minority group(s) are considered significant and adverse.

6.10.3 No Federal Action (Alternative Plan 1)

Under the No Federal Action Alternative, no expenditure of Federal funds to implement a comprehensive flood damage reduction plan would be offered in the project area. The project area would continue to endure frequent floods, economic loss, and potential loss of life. As periodic flooding would continue, flood damage would continue to cause hardship for residents and businesses. Because no relocations would occur, existing neighborhoods would remain intact and community cohesion would not be directly impacted. However, existing trends of outmigration and population decline would most likely continue. No impacts to recreational resources would occur with this alternative.

6.10.4 Structural (Alternative Plans 2 and 3)

The implementation of either Alternative Plan 2 or Alternative Plan 3 has the potential to directly and indirectly affect socioeconomic resources and community cohesion in Floyd County. Impacts to housing, income and employment, and community cohesion are discussed below.

Direct economic impacts would include the creation of a small number of construction jobs during construction of the floodwall. A smaller number of construction jobs would be created during the 15-year nonstructural program. The acquisition of structures could produce a higher demand for new development sites for both residential and nonresidential structures within the county. The construction of the floodwall would not be likely to create new jobs for the operation and maintenance of the floodwall infrastructure. Therefore, no economic impacts would occur as a direct effect once construction in the structural and nonstructural areas has been completed.

Indirect impacts could include a weakening of the social network within the county and smaller neighborhood areas in particular. The extent of weakening is based upon participation in the acquisition program. If there is a lack of suitable relocation sites, or if the market cannot accommodate the needs for housing, the county's population could decline if residents choose to relocate outside of Floyd County. Population decline could affect future levels of economic development, school enrollment, and service provisions by the county and communities. Acquisition of structures could negatively impact tax receipts collected by the City of Prestonsburg and Floyd County. Dispersal of existing communities could weaken familial ties and interrupt visitation patterns, which in turn could impact community organizations such as churches, schools and civic organizations.

Voluntary participation could produce an unusual pattern of development. Acquisition of a structure results in vacant property. Because acquisition could occur interspersed with other methods of flood protection or non-participation, irregular development patterns and weakening of community cohesion could result. Irregular development patterns created by voluntary participation could weaken familial ties and interrupt visitation patterns, which in turn could impact community organizations such as churches, schools and civic organizations.

Nonstructural Areas: Where raise-in-place is the only suitable floodproofing method for a given structure, it could present a barrier to the elderly participating in this program because of concerns expressed in neighboring counties with similar situations about being able to climb stairs.

The project could have long-term indirect benefits to recreational resources within Floyd County. As structures are removed from the floodplain, ownership of the acquired land would revert to county ownership. If contiguous properties were acquired, land use could change over time to include passive recreational areas such as parks or fishing access, wildlife areas, or gardens.

Structural Areas: The protected area may isolate areas west of the floodwall from Prestonsburg during times of high water and gate closure. However, it can be assumed that during times of high water, the river itself would interrupt activity. This may create several access and public safety issues, including access to medical services, fire and police services, grocery stores, and schools. These issues would be sporadic and temporary in nature, and a need for duplicate services is not anticipated.

Introduction of a floodwall would interrupt historical river access and potential future river access. A floodwall may also create a perception of lost river access for the general public.

Construction of the floodwall may have short-term noise and dust impacts for residents, Prestonsburg High School, the Community College and businesses within downtown Prestonsburg.

Property adjacent to areas where local streets are raised may have changes in grade between the structure and street.

Construction of the floodwall would relieve residents and business owners of the costs of flood insurance. Development restrictions specified in the local floodplain management ordinance that area associated with construction in the protected floodplain would be lifted creating opportunities for new growth, jobs and economic development. The floodwall would reduce public health and safety risks during and after flood events. In the event of a flood, the floodwall would reduce cleanup costs and time, and lost days at work or school.

Direct, short-term impact to recreational resources would occur at the athletic fields at Prestonsburg High School. Short-term impacts associated with construction of the floodwall include fugitive dust and odors (Section 6.5), noise (Section 6.6, and construction traffic (Section 6.12). In addition, construction activities would occur in close proximity and could disrupt facility usages during short periods. The USACE would continue on-going coordination with local officials and representatives to limit disruption to these facilities during construction.

The floodwall would have a direct long-term impact to parking areas and riverbank access behind the Prestonsburg High School athletic fields. This area would be separated by the floodwall from athletic fields. However, a gate closure and pedestrian opening in the floodwall would allow access to these areas during nonflood times. The Floyd County Fiscal Court and the Board of Education would need to resolve issues of operation and maintenance of the parking areas and athletic fields.

Access to the River Park, a small community park near RM 54.45 of the Levisa Fork, would be prohibited temporarily by gate closures during high water level conditions. This is not considered an adverse impact because it can be assumed that during times of high water, the river itself would interrupt activity.

The proposed borrow areas do not have organized recreational resources. It is possible that they are used for pastimes such as hunting or birdwatching by local residents. No direct or indirect impacts would occur from use of any of the three areas to obtain fill for the proposed project.

Alternative Plan 2: The floodwall would protect approximately 311 eligible structures, both residential and nonresidential, and an additional 331 structures in Prestonsburg not eligible for the Section 202 program. The construction work limits (CWL) for the floodwall would require the acquisition of nine residences, seven garages, and one government building. Additional properties located adjacent the river bank may be impacted by construction. The loss of yard area and elimination of direct access to the river would occur for approximately 23 structures. Impacts to the structures along the river may weaken the overall fabric of the neighborhood slightly and could reduce the desirability of the neighborhood as a place to live by current and future residents.

Construction of the floodwall would protect residents, businesses, schools, community services and infrastructure, thus reducing flood hazard risk during a flood event and property damage caused by flooding.

Alternative Plan 2 would have a relatively larger impact to public access and recreation because the floodwall would extend further downstream to protect the BSCTC. An existing walking path along the river would be affected.

Alternative Plan 3: The floodwall would protect approximately 308 structures, both residential and nonresidential, plus an additional 294 structures not eligible for the Section 202 program. The CWL for the floodwall would require the acquisition of nine residences, three garages, and one government structure (former emergency services office). Additional properties located adjacent the river bank may be impacted by construction. The loss of yard area and elimination of direct access to the river would occur for approximately 20 structures. Impacts to the structures along the river may weaken the overall fabric of the neighborhood slightly and could reduce the desirability of the neighborhood as a place to live by current and future residents.

Construction of the floodwall would protect residents, businesses, schools, community services and infrastructure, thus reducing flood hazard risk during a flood event and property damage caused by flooding.

Mitigation: Potential mitigation measures to address a shortage of decent, safe, and sanitary relocation housing, if needed, would be considered on a case-by-case basis. Since the nonstructural portion of this alternative would occur over a period of approximately 25 years, it is anticipated that market forces would be sufficient to create the bulk of available relocation housing. Mitigation measures would more likely be needed for the structural portions of the project because relocations would be mandatory and shorter in duration.

In accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (PL 91-646)*, as amended, residential and nonresidential property owners determined to be eligible only for floodplain evacuation would be offered the fair market value for their property (structure and land). In addition to the fair market value of the property, residential owners are offered standard relocation benefits (up to $22,500) under PL 91-646 to assist in the purchase of a comparable replacement home located out of the April 1977 floodplain area. Displaced persons, including those who rent, would also be compensated for eligible moving expenses. These individuals could relocate to similar equivalent housing within Floyd County as available.

If comparable replacement dwellings are not available in the implementation area, the last resort housing provisions of Section 206 of PL 91-646 would be implemented as necessary project-wide, on a case-by-case basis, utilizing the most feasible, cost-effective method available. This provision could include making payments in excess of those authorized by Sections 203 and 204 of PL 91-646.

For residents eligible for raise-in-place protection who are not able to climb stairs, other alternatives could include chairlifts, elevators, or ramps. For many people chairlifts are undesirable and elevators are cost prohibitive. The third method, ramps, may require more horizontal area than is available on small lots. Where stair alternatives are not feasible, special consideration would be given on a case-by-case basis.

Mitigation to address impacts to recreation areas would include gate closures and pedestrian openings along the floodwall would allow access to the Levisa Fork, including behind the Prestonsburg High School and the BSCTC during nonflood times. For Alternative Plan 2, the walking path at the BSCTC would be moved inside the floodwall protection area.

6.10.5 Nonstructural (Alternative Plan 4)

Direct impacts of a completely nonstructural program would be similar in nature, although greater in severity, than those discussed previously as part of the nonstructural component of Alternative Plans 2 and 3. However, in urban areas, such as Prestonsburg, implementation of a completely non-structural alternative has the potential to have a significant affect on socioeconomic resources and community cohesion. The majority of the homes and businesses within this area would be eligible for the voluntary non-structural program. As such, community impacts would be directly related to the non-structural program participation rate in these areas. Historically, under the Section 202 Program, commercial participation for non-structural floodproofing measures has been very low. Furthermore, residential participation in a non-structural program varies significantly, but would not be expected to reach 100 percent. Potential significant impacts associated with permanent evacuation, particularly in developed areas, would include the following:

- Community cohesion may be severely disrupted and longstanding sociological and historic ties may be lost.
- Remaining non-eligible areas or non-participating areas may not be able to function as a viable economic center and social unit because of a loss in population and tax base.
- Relocation into upland areas may occur outside the corporation limits of municipalities and relocated residents could lose the amenities and services furnished by those units of local government.
- Population loss and/or redistribution could impact schools, churches, services, and social organizations.
- Loss of tax base due to relocations out of the county/city areas.

If nonstructural flood protection methods are implemented within Prestonsburg, the acquisition of structures could produce a higher demand for new development sites for both residential and nonresidential structures within the county, resulting in a decline in the city's population. If vacant housing or new housing development sites are not available, a replacement housing shortage could influence participation and resettlement decisions made by residents.

Population decline could affect levels of economic development, school enrollment, and services provided by Prestonsburg. A decline in population could produce an overall weakening of the social network within the community. The extent of weakening is based upon participation in the acquisition program.

Voluntary participation could produce an unusual pattern of development as well. Acquisition of a structure results in vacant property. Because acquisition could occur interspersed with other methods of flood protection or non-participation, irregular development patterns and weakening of community cohesion could result. Irregular development patterns created by voluntary participation could weaken familial ties and interrupt visitation patterns, which in turn could impact community organizations such as churches, schools and civic organizations.

Raise-in-place floodproofing could present a barrier to elderly resident participation.

Some areas within Prestonsburg are ineligible for the Section 202 Program; therefore, parts of some neighborhoods would remain intact. Other parts of the same neighborhood would be eligible and participation in these areas could impact the integrity and cohesiveness of the neighborhood, which are generally well-established.

Areas in Prestonsburg have more well-defined neighborhoods than other nonstructural areas. Structures are evenly spaced, sidewalks are present, and neighborhoods are well-defined and stable. Participation in the nonstructural program in these areas will have a greater impact on the physical appearance and cohesiveness of these neighborhoods. Additionally, participation within well-defined neighborhoods could reduce the desirability of these neighborhoods as a place to live for current and future residents.

Acquisition would be the only nonstructural measure available to more than half of the eligible nonresidential structures in the downtown core of Prestonsburg because many structures cannot be floodproofed. Participation in the program could result in the loss of core commercial/governmental building stock in the downtown, thus producing an unusual pattern of development. It may be assumed that owners of downtown structures may not participate in the program to avoid negative impacts to their business. If these entities partake in the nonstructural program, it may affect their accessibility to populations currently being served as well as negatively impact tax receipts collected by the city of Prestonsburg and Floyd County.

Downtown Prestonsburg is the economic, cultural, social and political center of the community and the county. Important regional educational, business, finance, and social institutions occupy downtown structures in Prestonsburg. Participation in the acquisition program could have significant impacts to travel patterns, economic activity, community traditions, social institutions and prospects for county growth and development. For example, participation by the primary retail shopping complex could change travel and economic activity patterns for city and county populations shopping at stores within the complex.

Additionally, the participation in the nonstructural program by structures within the mixed use corridor north of State Highway 114 along North Lake Drive and in the Blackbottom neighborhood could weaken the physical fabric and economic cohesiveness of the business corridors.

Potential impacts previously described under Section 6.10.4 for the balance of Floyd County with nonstructural flood protection methods would be the same. Indirect impacts would be the same as nonstructural component of Alternative Plans 2 and 3 but greater in magnitude. Impacts to recreational areas would be the same as the nonstructural component of Alternative Plans 2 and 3. Floodplain acquisitions may provide additional opportunities for river access and recreation.

Mitigation: Same as Alternative Plans 2 and 3. This alternative is more likely to trigger last-resort housing because of the number of property acquisitions possible and potentially because of real estate market limitations.

6.10.6 Environmental Justice

Income. Poverty levels in Floyd County are well above state averages, with 26.2 percent of Floyd County families considered below the poverty level in 2000, higher than the statewide level of 12.7 percent.

Minorities. The population of Prestonsburg is comprised of mostly white residents, with only 2.5 percent of the population (25 people) self-identified as minority populations in the 2000 U.S. Census. The largest minority segments in Prestonsburg are the American Indian and Asian populations (1.0 percent of total minority population), which consist of 18 members and 19 members (respectively) of Prestonsburg's population.

Conclusions. No differences in environmental justice issues are expected from the construction and operation of any of the alternatives. None of the described alternatives would adversely or disproportionately affect members of minority populations because the minority populations are not concentrated in the implementation area and are not meaningfully greater in the implementation area than in the general Floyd County and Kentucky populations. The structural features would not adversely or disproportionately affect members of minority populations. In addition, the greatest potential adverse effect to members of low-income populations would be the required acquisition of residences and relocation of families within the proposed footprint of the floodwall. There would be no disproportionate impact to low-income populations. All displaced persons, regardless of race or income level, would be compensated for moving expenses and replacement housing in accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (PL 91-646)*, as amended.

6.10.7 Protection of Children

Environmental health risks and safety risks that may affect children would be related to construction and operation of the floodwall structure in Alternative Plans 2 and 3. The percentage of the population under 18 years of age is discussed in Section 5.11.1.

For both Alternative Plan 2 and 3, the Prestonsburg High School would be located adjacent to a construction staging area, the floodwall, a pump station, and ponding area. Increased dust, noise and vibration would be expected during construction, as described in Sections 5.6 and 5.7.

With Alternative Plan 2, the BSCTC would be adjacent to a construction staging area, the floodwall, a pump station, and ponding area. Increased dust, noise and vibration would be expected during construction, as described in Sections 5.6 and 5.7.

Mitigation: Mitigation measures for air quality and noise impacts are discussed in Sections 6.5 and 6.6. The potential for children to access construction areas would be controlled through construction site supervision and security practices. Access to the pump station would be prevented by fencing, locked gates and security doors.

6.11 Hazardous, Toxic, and Radioactive Waste

6.11.1 Impact Analysis Methodology

Existing and background information pertaining to HTRW for the study areas is summarized in **Section 5.13**, providing baseline data on existing known conditions within the project area.

This section evaluates potential impacts to each of these areas. Each project component is reviewed and evaluated to identify potential impacts (positive or negative) relative to existing conditions.

Numerous federal, state, and local laws regulate the storage, use, recycling, disposal, and transportation of hazardous materials and waste. Methods for assessing potential human health and safety hazard impacts generally include the following:

- Reviewing and evaluating each proposed action to identify its potential to use hazardous or toxic materials, or to generate hazardous waste, based on proposed activities
- Comparing the location of each proposed action with baseline data on known or potentially contaminated areas, such as contaminated land
- Using professional judgment to determine the existence of additional known or suspected potential human health and safety hazard impacts or concerns related to each proposed action.

6.11.2 Significance Criteria

Regulatory standards and guidelines have been applied to determine the significance of each proposed action's potential impact from non-chemical hazards to HTRW. Factors considered in determining whether or not an alternative would have a significant HTRW impact include the extent or degree to which its implementation would or could result in one of the following:

- Generation of 1,000 kilograms (or more) of hazardous waste, or 1 kilogram (or more) of acutely hazardous waste in a calendar month (40 CFR 262), resulting in increased regulatory requirements over the long term
- Spill or release of a hazardous substance, as defined by 40 CFR 302 (CERCLA, or 40 CFR Parts 110, 112, 116, and 117 CWA)
- Exposure of the environment or public to any hazardous condition through release or disposal practice
- Requirement of the removal or upgrade of a UST
- Accidental release of friable (easily crumbled by hand pressure) asbestos or Lead-Based Paint (LBP) during the demolition or renovation of a structure
- Expose the public to electromagnetic fields with cycle frequencies greater than 300 Hz

6.11.3 No Federal Action (Alternative 1)

The No Federal Action Alternative would result in no impact, as the project would not be constructed.

6.11.4 Structural (Alternative Plans 2 and 3)

Prior to construction activities, each property affected by the Proposed Action would be evaluated for HTRW and any work necessary to address potential HTRW issues would be addressed prior to construction or demolition activities. Methodology and significance criteria as listed in **Sections 6.11.1** and **6.11.2** would be followed.

The purpose of the HTRW investigations is to determine the potential impacts related to the presence, handling, storage, transportation, and disposal of hazardous, toxic, and radioactive waste materials on properties within the implementation areas. Phase I HTRW investigations are nonintrusive evaluations of the potential presence of HTRW or other potential environmental issues with the potential to affect the property. Phase II(a) HTRW investigations are performed on properties identified during the Phase I HTRW investigation. Phase II(a) HTRW investigations include intrusive sampling techniques and laboratory analyses to confirm the presence of HTRW. HTRW identified during the Phase II(a) investigation must be addressed prior to implementation of construction activities.

Each structure scheduled for demolition would be inspected for asbestos. State and USACE requirements would be followed to prevent airborne release of asbestos during demolition. State and local requirements would be followed for disposal of asbestos-containing construction debris.

Should an UST be encountered during construction, construction in the area would be stopped and the tanks would be addressed per Kentucky regulations.

Solid non-hazardous waste generated by project implementation would be disposed of at a licensed landfill.

Borrow areas were not evaluated in the Phase I HTRW Investigation performed for the implementation area, as they had not been identified at the time of the investigation. Phase I HTRW investigations will be conducted on borrow areas selected for further consideration.

Mitigation: Construction would be performed in accordance with and in compliance with applicable federal, state, and local requirements.

6.11.5 Nonstructural (Alternative Plan 4)

Individual properties identified for demolition or nonstructural measures, such as ringwalls, will be evaluated for HTRW and any work necessary to address potential HTRW issues will be addressed prior to construction or demolition activities.

Mitigation is the same for project implementation in the nonstructural areas.

6.12 Health and Safety

Occupational and public health and safety issues have been evaluated in the context of those activities with the potential to affect human health and safety. The areas identified are construction noise and air emissions, construction traffic and detours, and flooding. Air quality, noise, and water quality considerations are addressed in other sections.

Implementation of agency action would reduce the number of Floyd County residents subject to flooding. This action would be a significant benefit to the population, especially children, elderly persons, and disabled persons who are routinely threatened by flooding, being stranded, drowning, and other safety issues.

The level of impacts to community services would depend on resettlement patterns.

A significant population addition or loss to an existing municipality would affect tax revenues, which could stress local fire and police services. In addition, dispersal of a community reduces the efficiency and increases the costs of emergency services.

Medical services would likely experience a slight increase in use due to the minor accidents typically associated with a large construction project. Barring a major accident however, medical services would not be stressed beyond capacity.

Also during construction, hazards from utility disruption, such as electric lines and natural gas, could be a concern. Scheduled disruptions may be necessary to move utilities. In addition to residential areas, natural gas lines were observed on or near each of the alternative borrow areas. Disruption of utilities would impact hospitals and clinics as well as inconvenience residents.

Mitigation: The USACE would coordinate with local officials and public safety departments (police, fire, and health), as well as utility providers prior to construction to minimize disruptions and hazards during and after construction.

6.13 Infrastructure

6.13.1 Impact Analysis Methodology

Existing and background information pertaining to infrastructure for the study areas is summarized and presented in Section 5.15, providing baseline and historic use data on potable water supply, wastewater treatment, solid waste disposal, energy sources (e.g., electrical power, fuel oil, and propane gas), telecommunications, and transportation (e.g., roadways, traffic, rail access, and air operations). This section evaluates potential impacts to each of these topical areas. Where potential infrastructure shortfalls, inconsistencies, inadequacies, or deficiencies are identified between the existing infrastructure and a proposed action's infrastructure requirements, an impact is identified.

Population changes projected for the applicable geographic locales were used for forecasting utility and public services demands, based on average per capita values when available. These utility forecasts were compared with existing levels of use and infrastructure capacities to determine if capacities would be exceeded.

6.13.2 Significance Criteria

Factors considered in determining whether or not an alternative would have a significant impact on public services and utilities include the extent or degree to which its implementation would result in the following:

- Interruption or disruption of any public utility service, as a result of physical displacement and subsequent relocation of public utility infrastructure, such that the result would be a direct, long-term service interruption or permanent disruption of essential public utilities.
- Requirement of an increase in demand for public services or utilities beyond the capacity of the utility provider such that substantial expansion, additional facilities, or increased staffing levels would be necessary.
- Measurable increase, due to increased traffic generated by the action, in the volume to capacity ratio of local roadways and/or the average stopped seconds of delay per vehicle at intersections. For example, a significant impact would occur at intersections if, during a.m. and p.m. peak hours, the action would contribute more than two percent of the total future volume at a given intersection and/or would cause additional traffic delays.
- Temporary or permanent road closures that would affect public circulation on public rights-of-way.

6.13.3 No Federal Action (Alternative Plan 1)

This alternative would not cause direct changes to existing infrastructure. However, the infrastructure would continue to be subject to the periodic flooding of the Levisa Fork, with its associated damages and disruptions. Substations, power lines and treatment plants would continue to be flooded, put out of service and damaged, costing money to restore service.

The transportation system would not be affected by the No Federal Action Alternative. No detours, closings, or additional traffic would occur from floodwall construction or new floodgate closure. However, since the area would continue to experience periodic flooding, existing flooding patterns would continue to impact roadways and rail lines. Floodwaters would continue to cause temporary road closings and damage to road structures.

6.13.4 Structural (Alternative Plans 2 and 3)

Nonstructural Areas: In the wider Floyd County nonstructural implementation area, the project would have a minor direct effect on utilities. Impacts would most likely be limited to individual utility connections for acquired and demolished structures, or structures to be raised in place or moved. The USACE would coordinate with local utility providers to avoid service disruptions to other properties in the area while water, gas, sewer, telephone, cable, or electric lines are modified as required to modify or demolish a structure.

A potential temporary impact on water quality could occur from closure and removal of septic systems. BMPs used in removal would limit the potential for impact. Long-term impacts to water quality would be beneficial, as some septic systems and/or straight pipes would be removed from the floodplain for property acquisitions. Additional benefit would also occur from floodproofing actions, as the USACE would replace straight pipes and/or faulty septic systems as part of the floodproofing action for individual structures.

Countywide utility systems could be indirectly affected, primarily due to the voluntary nonstructural component. A high participation rate for voluntary evacuation could affect the distribution of utility needs, increasing cost and require capacity adjustments within Floyd County. Implementation area residents generally have public water service currently and some have sewer services. The nonstructural component would address structures over a period of approximately 25 years, providing adequate time for utilities to adjust to changing needs.

In the nonstructural program implementation area, the transportation system would not be affected. No detours, closings, or additional traffic would occur. However, since the area would continue to experience periodic flooding, existing flooding patterns would continue to impact roadways and rail lines.

Structural Areas: Alternative Plans 2 and 3 would add a floodwall and the associated interceptor lines, pump stations, sumps and gate closures as described in Section 4 of this EIS. Existing water and sewer lines within Prestonsburg would require some relocation work due to the floodwall construction and the removal of existing structures and their respective utility connections. Ongoing coordination between USACE and the City of Prestonsburg will continue to minimize potential disruption and cost associated with utility relocations. Telephone lines and power lines would be impacted and require localized relocation or abandonment.

The sewage treatment facility is located immediately north of the floodwall under Alternative Plan 2. The facility would not impacted nor be protected from flooding either Alternative Plan 2 or 3. During periods of flooding, raw sewage may overflow and briefly contaminate downstream sections of the Levisa Fork as would occur under current conditions.

The transportation system would be affected by construction of either floodwall. During construction, temporary local roadway detours and closings would occur. Localized traffic issues would be expected, especially in the downtown area as roadway modifications are made. Third Street, Short Street, Maple Avenue, Arnold Avenue, and Front Street would have short-term impacts from gravity wall construction or from roadway improvements designed to raise the roadway centerline above the one percent chance flood event elevation. During floodwall construction, temporary lane closings would be expected on Riverside Drive, North Lake Drive and local streets.

Additional traffic would be expected, consisting of trucks, workers' personal vehicles, and construction equipment. Debris and soil may deposit on roadways from construction vehicles, providing safety hazard as well as annoyance to residents.

Depending which borrow area are used for soil, different roadways would be affected. For Granny Fitz Branch and Spurlock Creek Branch, haul routes would likely use a combination of KY 114, US 23, and KY 1428 (Lake Drive). For PB-01, haul routes would likely use KY 321 and KY 1428 (Lake Drive). Congestion would occur in the downtown area on KY 114, KY 1428 (Lake Drive) and/or KY 321. No substantial impact would be expected on US 23.

After construction, traffic impacts would occur during flood events. For Alternative 3, a 30' x 8' gate closure would cross North Lake Drive just south of Porter Drive. Residents would not be able to travel directly north to cross the Levisa Fork on KY 1428 (Lake Drive) to access US 23. They would instead travel south on Lake Drive to cross the Levisa Fork at KY 114 and access US 23.

The CSX rail line on the opposite side of Levisa Fork would be slightly impacted by operation of either floodwall. The rail line runs at approximate elevation 625 along the left bank of the Levisa Fork opposite much of Prestonsburg. Predicted water levels during flood events with and without the floodwall were reviewed to evaluated potential impacts. The difference in water level would be less than two inches at the 10 percent chance (10-year frequency) event and less than four inches at the one percent chance event at Prestonsburg, and the rail line would be inundated with or without the floodwall present. During the one percent chance event, the railroad is inundated by more than 10 feet.

Borrow Areas: Use of the borrow areas could have a minor impact on utilities. Although the areas do not appear to have structures on them, there are possibly buried utility connections. No utility surveys have been conducted on the three borrow areas. During a site visit, gas line markers were detected in the Granny Fitz borrow area and a radio tower and guy wires were observed on the Spurlock Creek property. Investigations would be conducted prior to soil excavation.

Mitigation: Ongoing coordination with local utility providers and local jurisdictions would allow sufficient planning time to avoid utility short-term disruptions and long-term capacity or distribution issues.

A traffic maintenance plan would be prepared by the USACE or its construction contractor prior to construction, in coordination with local jurisdictions and emergency service providers. Traffic detours, road closings, and other necessary traffic maintenance measures would be prominently posted and also provided to local newspapers in advance. Access would be maintained for residents during construction.

A hauling plan would be prepared by the USACE or its construction contractor prior to construction. This plan would specify haul routes for soil, rock, and other construction materials. If necessary per the hauling plan, restrictions on hours of hauling would be specified. The plan would be coordinated with local and county government during its development.

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (PL-91-646) and ER 1165-2-117 *Responsibility for Costs of Improved Standards in Highway and Housing Relocations* would allow for floodproofing activities on individual structures to include measures to upgrade substandard water and sewer utility connections.

6.13.5 Nonstructural (Alternative Plan 4)

Impacts to service providers within Prestonsburg would be greater than in Alternative Plans 2 or 3. The number of water, gas, sewer, telephone, cable, or electric hookups could change, depending on the number of relocations. This could affect utility rates and the type of services provided. In the balance of the county, impacts from Alternative Plan 4 would be the same as those described for the nonstructural component of Alternative Plans 2 or 3.

While residences and businesses would be offered flood protection throughout the Floyd County implementation area, roadways and rail lines would be unaffected. The types and severity of access limitations due to storm events would remain unchanged. Construction detours, closings, or additional traffic would occur if individual homes are relocated. However, since the area would continue to experience periodic flooding, existing flooding patterns would continue to impact roadways and rail lines.

6.14 Cumulative Impacts

6.14.1 Methodology

An inherent part of the cumulative effects analysis is the uncertainty surrounding actions that have not yet been fully developed. The CEQ regulations provide for the inclusion of uncertainties in the EIS analysis and states that "when an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an EIS and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking" (40 CFR 1502.22). The CEQ regulations do not state that the analysis cannot be performed if the information is lacking. Consequently, the analysis contained in this section includes actions that could be reasonably anticipated to occur during the lifetime of the Levisa Fork (Floyd County) Section 202 Flood Damage Reduction Project, likely to have cumulative effects within the Levisa Fork Basin.

In evaluating each of the resource areas for cumulative effects, focus is given to those areas likely to be impacted throughout operation of the project, and thus could be cumulatively affected by other activities. This narrowing of the scope of analysis supports the intent of the NEPA process, which is "to reduce paperwork and the accumulation of extraneous background data; and to emphasize real environmental issues and Alternatives" (40 CFR 1500.2[b]).

The qualitative cumulative impacts analysis presented in this document is based on the potential effects of the Levisa Fork (Floyd County) Section 202 Flood Damage Reduction Project when added to similar impacts from other projects in the region. The region of influence (ROI) considered for the cumulative impacts analysis is the Levisa Fork Basin, with a drainage area of 2,236 square miles. Floyd County is located near the center of this watershed. The Levisa Fork Basin includes all or parts of Pike, Floyd, Johnson, Knott, Magoffin, Morgan, and Lawrence Counties, Kentucky and Dickenson, Wise and Buchanan Counties, Virginia (see **Figure 1-1**). Forests cover approximately 80 percent of the basin. Relative to forested land, urban land areas are small and scattered. Approximately ten percent of the land area is suitable for urban development, and most of that area is located within the floodplain.

In the previous resource descriptions and impacts analysis, Chapters 5 and 6, the affected environment and potential environmental consequences of the No Federal Action (Alternative Plan 1), Structural (Alternative Plans 2 and 3), and the Nonstructural (Alternative Plan 4) were evaluated with respect to existing conditions or "background." This takes into account past and present actions in the vicinity of the Levisa Fork (Floyd County) Section 202 Flood Damage Reduction Project.

Major past actions include construction of the Pikeville Cut-Through, Dewey Lake, Fishtrap Reservoir on Russell Fork, and the John Flannagan Dam on Johns Creek. The Pikeville Cut-Through was constructed from 1973 – 1987 and created a 3/4-mile channel through Peach Orchard Mountain, providing a path for railroad tracks and rerouting of the Levisa Fork U.S. Highways 23, 460, 119, and KY 80. The Cut-Through created a channel for the Levisa Fork to bypass downtown Pikeville. Dewey Lake is part of the integrated flood reduction system operated by the USACE for the entire Ohio River Basin. When the lakes in this system are operated as a vast storage system, flood crests along the Ohio River can be significantly reduced. The 1,130-acre Fishtrap Lake, on the Russell Fork, was completed in 1968 to provide flood control for communities downstream. The 1,145-acre John Flannagan Reservoir located near Haysi, Virginia near the Kentucky border was completed in 1964 and is part of the Big Sandy flood protection system.

However, discussions in this section center on the potential cumulative effects of reasonably foreseeable future actions in the Levisa Fork Basin. The construction of the entire Levisa Fork (Floyd County) Section 202 Flood Damage Reduction Project, including a nonstructural component for any action, could occur over a period of up to 15 years depending on the participation rate in voluntary programs. This cumulative impacts analysis focuses on the construction and post-construction (operation) periods, which coincides with other reasonably foreseeable future actions.

6.14.2 Cumulative Impacts

Reasonably foreseeable actions which may together have significant adverse affects within the basin are flood control projects, road construction, new housing construction, and mining. The USACE has authority to study flood damage reduction measures, similar to those of the Levisa Fork (Floyd County) Flood Damage Reduction Project, for other communities in the Levisa Fork Basin:

- Non-structural measures, Dickenson County, Virginia, Levisa Fork Basin (EA completed May 2003)
- Non-structural measures, "Town of Martin", Floyd County, Kentucky (EA completed March 2000)
- Nonstructural measures, Buchanan County, Virginia, Levisa Fork Basin (EA completed November 2001)
- LPP and non-structural measures, Pike County, Kentucky, Levisa Fork Basin (Draft EIS circulated March 2004)
- LPP and non-structural measures, Johnson County, Kentucky, Levisa Fork Basin (planned)

Adverse cumulative impacts to communities throughout the Levisa Fork Basin are possible. Socioeconomic resources likely to have cumulative effects from other reasonably foreseeable future projects include housing, education, infrastructure, and community cohesion. Of the 3,630 eligible structures, approximately one-third would likely relocate. This relocation would take place over an approximate 25-year period, with the location of new housing construction driving changes in school location and transportation, commuting patterns, infrastructure creation, and community services. Stable, decent, and fiscally sound communities could be weakened by individual landowner decisions to relocate to other areas within or outside of Floyd County and the Levisa Fork Basin.

Cumulative impacts from the Pike County, Floyd County, Johnson County, and Lawrence County nonstructural programs could occur from the numbers of people offered the floodplain evacuation option. With the various nonstructural projects throughout the Levisa Fork Basin and a reduction in community housing stock, the relocations could affect the housing markets. Both the availability and the cost of housing could be affected. Generally, new housing construction in Floyd County is limited and home values have not been rising significantly. The cumulative impacts from large numbers of relocations could change the housing market.

Communication with the Big Sandy Area Development District indicated that the housing market should be able to absorb the relocations without major adverse effects. In the Tug Fork area, a latent housing market appeared as homeowners who previously had not had their homes for sale, possibly due to a lower housing demand or price for available housing, began to list their homes for sale. Motives for this new availability of housing could be ability to sell homes for a higher price and leave the area themselves or “move up” to higher value or newer homes. Last Resort Housing was used on some Tug Fork projects to ameliorate a housing crunch by constructing additional housing sites. While this option is available, it is not preferred.

Shifting populations, as people relocate outside the floodplain areas, could affect churches, schools, emergency services, social services and other organizations. Depending on where people relocate, churches, schools and other organizations could be negatively affected as people attend different churches and schools. The cost and ability of emergency services to respond effectively could be changed as populations shift away from the more urban areas in the floodplains. Floyd County is already experiencing a decrease in population as younger people leave the County seeking education and employment opportunities. This project could increase the flow of people leaving Prestonsburg, other urban areas, and Floyd County.

County and municipal tax revenues could drop and organizations could suffer as people and possibly businesses leave the area. To maintain services, increases in property tax for people who receive floodproofing measures and others who remain in the area could occur. As people relocate, businesses may see a reduction in revenues and therefore, reduce the number of employees, shift to a new location, or close. The potential exists for an increase in unemployment in floodplain areas evacuated and an increase in unemployment benefits and/or welfare payments. If commercial property tax revenues decrease, additional pressure could occur to increase property taxes. Areas receiving new populations would receive an increase in tax revenues but may have to adjust to the increased enrollments for schools or differing needs for emergency services and social services.

The majority of actions planned or recently taken by the USACE within the Levisa Fork Basin involve nonstructural measures, which have potential for long-term beneficial impact on the floodplain and on riparian habitats within the basin. By removing structures and human activity from the floodplain, more flood storage is created and the riparian corridor may be re-established. Structural projects under consideration are localized in scale and designed to protect specific high-density population areas. The nearest structural project under consideration by the USACE is in Pikeville and Coal Run Village (Pike County) Kentucky, 20 miles upstream of Prestonsburg.

Adverse cumulative impacts to water and ecological resources could also occur. The cumulative effects to water resources occur primarily during high water events, when hydrologic conditions are altered by the flood control structures. Effects on water resources, based on a decrease of the available Levisa Fork floodplain, are increases in the local floodwater elevation and increases in water velocity due to constriction of the channel, which can increase scour. However, since nonstructural measures would predominate within the Levisa Fork basin, changes in hydrologic conditions would be localized.

Pools and riffles within this reach are most likely formed, moved, and transformed annually under existing conditions. The forming, moving, and changing of pools and riffles would continue to happen after construction of the floodwall. Although additional sedimentation from the Floyd County flood control project would be temporary and minor, sediments transported during flood events that would otherwise be deposited in the floodplain would be carried farther downstream. Other reasonably foreseeable flood control projects could contribute to increased scour and sediment loading of the Levisa Fork during high flood events, but these would be localized.

The cumulative effects to terrestrial resources include impacts to riparian habitats and upland terrestrial habitat. The Levisa Fork (Floyd County) Section 202 Flood Damage Reduction Project would result in a direct loss of 11 acres or less of bottomland forests from construction of either of the two alternative floodwalls. The approximate ten-foot maintenance access buffer, included in the above acreage, would be created along the riverward side of the floodwall, permanently converting this area to a treeless environment. However, the terrestrial mitigation-in-place plan provides for revegetation of reclaimed riparian corridor riverward of the floodwall access buffer, resulting in net creation of riparian habitat.

While localized adverse impact to aquatic resources during high water events within the lower Levisa Fork Basin could result from floodwall projects, the basinwide riparian habitat could benefit from the removal of structures and people from the floodplain. These benefits could be partially offset if the housing demand created by the relocations programs spurs new housing construction outside the floodplain. Habitat loss on hillsides and upland areas would occur. For most of the counties along the Levisa Fork, the new housing would be on steeper terrain. Increased erosion and sedimentation into the tributaries of the Levisa Fork could happen due to the steeper slopes and an increase in paved surfaces. Federal, state, and local construction erosion and sedimentation controls that are required should minimize this possibility. The new housing could increase the need for new infrastructure (e.g., roads, water and sewer pipelines and treatment plants). Relocations from areas with sewer services could have the potential to increase the use of septic systems and straight pipes which could negatively affect water quality.

A change of species composition would occur in these altered environments. This overall loss of riparian habitat could be compounded by other reasonably foreseeable flood control projects that could have similar losses. Pressures to find new food sources and habitats would increase as species lose more habitat area to development. However, the nonstructural portion of Alternative Plans 2 and 3 would help to mitigate effects of floodwall construction, since some people would voluntarily evacuate the floodplain to live in upland areas, increasing flood storage and allowing revegetation of the floodplain.

Resource extraction, especially coal, is a major industry in Floyd County, and one of the major industries in the Levisa Fork Basin. Substantial areas of the basin have been mined over the years. Mining and sporadic reclamation activities have resulted in ongoing pollution of the Levisa Fork and many of its tributaries. It is reasonably foreseeable that there would be ongoing mining activity during the lifetime of the Floyd County Section 202 project that would cumulatively affect both terrestrial and aquatic resources. The potential effects of continued and/or increased coal mining by the mining industry could be periods of increased surface runoff due to removal of vegetation and release of contaminants, such as acid mine drainage and slurry. This increased and/or contaminated runoff would cumulatively increase creek and floodwater elevations and velocities within the Levisa Fork Basin, and continue to adversely affect water quality. Both of these situations would adversely affect aquatic resources during high and low water events within the Levisa Fork Basin.

The KYTC is responsible for the planning, construction, reconstruction, and maintenance of state roads. A variety of U.S. and State Routes follow the curves of the Levisa Fork and its tributaries within Floyd County's narrow valleys. It is reasonably foreseeable that road construction and maintenance activities would be periodically required throughout the lifetime of the project. However, such construction activities would be temporary and would not be expected to contribute significantly to cumulative impacts.

6.15 Unavoidable Adverse Impacts

Unavoidable adverse impacts would occur with the No Federal Action (Alternative Plan 1), Structural (Alternative Plans 2 and 3), and Nonstructural (Alternative Plan 4).

With the No Federal Action Alternative, no measures would be taken to address the existing impacts associated with flooding of the Levisa Fork within Floyd County. Since the Levisa Fork is expected to continue to flood periodically, the losses to property and the resultant stress to residents would also continue.

Both of the structural Alternatives would also have unavoidable adverse impacts. Anticipated impacts are discussed below:

- Long-term minor adverse impacts would occur to the visual resources in the vicinity of the floodwall structures. Under either alternative, views that currently include the Levisa Fork would be unavoidably restricted by the presence of the floodwall structure. Views from the in or near river, such as fishing or boating, would be changed.
- Noise and air emissions associated with floodwall construction would occur. These impacts would be temporary in nature, and BMPs would be used to minimize their severity.
- Short-term adverse impacts would occur to the Levisa Fork during construction. BMPs would be used to limit erosion and sedimentation from construction activities. Riverine habitat enhancement as discussed with regulatory agencies and described in the conceptual mitigation plan would be used as mitigation for these impacts.
- Either alternative would cause a complete short-term loss of the habitat associated with Trimble and May Branches within the CWL. These areas would be used

both as a ponding area for interior drainage and as the location for pump stations. In-lieu fee compensation would be used to mitigate stream losses.

- Long-term loss of some ecological habitat and some residences and businesses would occur within the floodwall footprints. Each alternative footprint and CWL was refined to limit the amount of acreage necessary to provide flood damage and to construct and maintain the structures.
- Previously undiscovered cultural resources within the CWL would be adversely affected by either alternative. The USACE would address cultural resource in accordance with the existing Programmatic Agreement among the USACE and the Kentucky State Historic Preservation Officer.
- Mandatory displacement of families and businesses within the CWL would occur. The USACE has refined alignments to minimize the number of mandatory acquisitions.

The nonstructural alternative (Plan 4) would also have unavoidable adverse impacts. Noise and air emissions associated with either structure demolition or raising the structure in place would occur. BMPs would be used to minimize these necessary impacts. Residents would be displaced while their homes are raised in place to put the first floor above the 1977-flood level. These impacts would be temporary and localized.

6.16 Irreversible and Irretrievable Commitments of Resources

Both Alternative 2 and Alternative 3 would irreversibly and irretrievably commit the existing ecological habitats within the respective floodwall footprints, in the approximately 300 feet of Trimble Branch and the approximately 734 feet of May Branch within the CWL. Also committed would be any previously undiscovered cultural resources in these areas that may be discovered during construction.

Commitment of resources associated with Alternatives 2, 3, or 4 includes consumption of fossil fuels by construction equipment and workers' vehicles, and to a lesser extent, fuel consumption for long-term operation and maintenance of the facility. Also, materials of construction will be irreversibly committed. The demolition of sound, existing structures will be an irreversible commitment of resources.

6.17 Relationship Between Short-Term Use of the Environment and the Maintenance and Enhancement of Long-Term Productivity

Disruption caused by unavoidable construction of either Alternative Plan 2 or Alternative Plan 3 would cause significant impacts on the short-term use of both the human and natural environment within and adjacent to the CWL. For Alternative Plan 4, similar types of impacts would occur during structure demolitions or raising-in-place, but they would be generally occurring on one property at a time and for a shorter duration. Human and wildlife activities would be affected associated traffic, noise, and dust due to the close proximity of construction activities. However, the use of BMPs and specific mitigation measures discussed in this EIS would minimize these impacts and would not be significant.

Implementation of either Alternative Plan 2 or Alternative Plan 3 would cause long-term loss of ecological habitat and associated productivity for those areas where floodwall infrastructure is placed. Short-term loss of ecological habitat would occur in the remainder of the CWL and in borrow area(s). Either alternative would cause short-term disruption to the Levisa Fork from bank stabilization. Either alternative would cause complete short-term loss of 412 feet and 837 feet of stream habitat in Trimble and May Branches (respectively) within the CWL. Additionally, a complete long-term loss of 322 feet and 184 feet of stream habitat in Trimble and May Branches (respectively) would occur as a result of permanent floodwall infrastructure.

For both structural alternatives, habitat riverward of the floodwall is included in the proposed property acquisition and the riverward habitat outside the CWL would either not be disturbed or would be enhanced as part of a final mitigation plan. Over the long term this riverine area could revert into more productive habitat. The banks of the Levisa Fork, Trimble Branch, and May Branch would be stabilized where necessary, and water quality would be indirectly improved by reducing erosion and sedimentation. The proposed mitigation/enhancement measures included in this EIS would contribute to the maintenance and enhancement of long-term productivity of the Levisa Fork Ecosystem.

CHAPTER 7. PUBLIC INVOLVEMENT, REVIEW AND CONSULTATION

7.1 Public Involvement Program

Public participation is a significant component of the EIS process. The USACE considers public comments before making a decision. This section summarizes key public notification and participation events that have occurred as part of this process, and summarizes key issues identified during the public scoping process for this EIS.

A Notice of Intent (NOI) to prepare an EIS was given to the public and was published by the USACE in the *Federal Register* on October 30, 2003, thereby initiating a 60-day comment period on the proposed actions. Notices advertising this action to the local public were also published by the USACE in the Appalachian News Express.

A public scoping meeting was held in order to receive public comments on the proposed actions with the purpose of assisting in defining the scope of analysis in the EIS. The meeting was held at Prestonsburg High School on November 13, 2003. Approximately 64 persons attended the scoping meeting. Comments received during the scoping process have also been included in Annex A. Community Surveys conducted as part of the socioeconomic impact and community cohesion analyses are included **as** Annex C.

The public scoping process for this EIS identified that interested parties were concerned about the mandatory relocations associated with floodwall construction, program eligibility, impacts to property values, impacts to viewshed and access to the Levisa Fork, and loss of community cohesion. In response to these concerns, the EIS has placed increased focus on those topics of local concern.

USACE project staff held open office hours every Tuesday in Prestonsburg, KY from August 2004 to January 2005. In January 2005, office hour frequency was reduced to once a month.

A Floyd County Task Force was formed to help communication flow between the USACE, Floyd County officials, and members of the community. The Task Force met the first Tuesday of every month from July 2004 until June 2005.

Additional public involvement activities conducted during this project are listed in **Table 7-1.**

Table 7-1. Additional Public Involvement Activities

Date	Location/Topic	Activity
February 1, 2002	Prestonsburg, KY - Courthouse	Initial meeting with county representatives to establish contact and define project area.
March 13, 2002	Prestonsburg, KY – Lon May’s Office	Discuss scope of work.
March 26, 2002	Prestonsburg, KY – City Municipal Building	Brief Prestonsburg Fire Department on Section 202 program so they can answer questions during door-to-door visits.
July 30, 2002	Harold, KY, WPRG TV Station	One-hour TV talk show. Discussion on the Section 202 program and Study. (Lon May, Tammy Riffle, Steve Wright, and Dr. Don)
August 6, 2002	Huntington, WV, WPRG Radio Talk Show	Project discussion with Dr. Don
October 30, 2002	Prestonsburg, KY - Courthouse	Update Team meeting with County. Media taped entire meeting to play on local station.
January 30, 2003	Prestonsburg, KY	Site visit to ID municipal structures and EC team walked the alignment.
November 5, 2003	Radio Talk Show (From Huntington)	Radio interview on WPRG-Harold to discuss upcoming EA/EIS public meeting on November 13, 2003 at the Prestonsburg HS at 4:30 to 8:00pm
November 26, 2003	Prestonsburg Fiscal Courtroom	Project update with sponsor and other invited residents. Went over maps of long and short walls. Conducted panel question and answer session.
Dec 8, 2003	Prestonsburg City Hall	Ted Hamb and Tammy Conforti attended a Prestonsburg City Council Meeting. USACE took questions about the study.
March 7, 2004	Community United Methodist Church	Update meeting with the church board.
June 5, 2004	Prestonsburg Community College	Kentucky Waterways Alliance Annual Conference. USACE spoke about Kentucky projects, and Floyd County project.
July 14, 2004	Prestonsburg Community College, Postsecondary Education Building, Rm 220	First Kickoff Meeting for Task Force. Minutes recorded in Projectwise.
September 9, 2004	Update meeting, Prestonsburg	Attendees: Lon May, Jerry Fannin, Judge Paul Thompson, Brett Davis, Bob Carpenter, Michelle Gooslin, John Yeager, Ted Hamb, Tammy Conforti, Terry Noble, Jeff Yost, Don Whitmore, Ken Bumgardner, John Yeager
November 9, 2004	Prestonsburg	Meeting to update Judge Thompson on Alternatives Attendees: Conforti, Yeager, Hamb, Elliot, Dethman, Bledsoe, May, Fannin, Brett Davis, Judge Thomson by phone.
January 4, 2005	Task Force Meeting, Prestonsburg	Attendees: Lon May, Bob Carpenter, Tom Vierheller, David Ellis, Martha Dameron. Discussed final alternatives. Main concern will be aesthetics. Need to talk to college about ponding areas.
January 24, 2005	Prestonsburg City Council Meeting	Project update.

Table 7-1. Additional Public Involvement Activities

Date	Location/Topic	Activity
February 1, 2005	Office hours and Task Force Meeting	Mark Miller stopped by requesting an update on the project. The wall will be going through his back yard. Was in favor of the project. Boots Adams stopped by for an update and was satisfied with the project. Task Force Meeting Attendees: Conforti, Lon May, Carlos Neeley, Norma Neeley, David Ellis, Jimmy Campbell, Roy Johnson (for the Board of Education), Bob Carpenter, and Tom Rose.
February 18, 2005	Floyd County Fiscal Court Meeting	Televised and recorded by Fiscal Court. District attendees – Tammy Conforti, Ted Hamb, John Yeager, Gary Walker, and Kevin Nelson. Presented current status of project and final recommendation. David Layne had conducted a survey on North Arnold Ave and stated that 95% of residents on there would rather have the wall on riverbank instead of street. It was requested the Corps look at other construction methods in order to minimize impacts. Another meeting with magistrates and Arnold Ave residents will be scheduled.
March 1, 2005	Site visit door to door with North Arnold Ave residents and meeting with Judge Thompson	Project update.
March 1, 2005	Prestonsburg – Task Force Meeting	Attendees: Ted Hamb, Tammy Conforti, Gwinn Hall, Bob Carpenter, Carlos and Norma Neeley, David Ellis, Jimmy Campbell, Tom Vierhieler, Caroline and Mike Patrick. Discussion of the last Fiscal Court meeting. Caroline Patrick owns property on Arnold Ave and is in support of the project. She has also talked with others on Arnold Ave. Everyone she has spoken with overall in support of the project. She wants to start attending other meetings and will speak up in the next Fiscal Court meeting.
March 4, 2005	Fiscal Court Working Session – Prestonsburg.	Project update.
April 4, 2005	Fiscal Court Working Session – Prestonsburg	Project update. Result – Fiscal Court unanimously supports Plan B – riverbank alignment. Will announce final recommended plan at next public meeting.
April 5, 2005	Task Force Meeting - Prestonsburg	Attendees only included Lon May, Bob Carpenter, and Tammy Conforti. Brainstormed ideas for next public meeting. Mayor Sharon Woods at Allen requested that I come to the next City Council meeting in Allen to provide an update of the project. No minutes recorded.
May 3, 2005	Task Force Meeting – Prestonsburg	Attendees: Tom Vierhieler, Lon May, David Ellis, Bob Carpenter, and Jimmy Campbell. Discussed final alignment and strategies for the public meeting.
May 10, 2005	Public Meeting	Project update.
June 7, 2005	Office Hours	Tammy Conforti, Steve O'Leary, John Yeager, and

Table 7-1. Additional Public Involvement Activities

Date	Location/Topic	Activity
	Prestonsburg	Jared Bledsoe. Four visitors came in. Decided to disband Task Force, but continue monthly office hours.
June 7, 2005	Public Meeting – Allen – City Hall	Purpose was to answer questions about DPR II and the project. Main concerns focused on the H&H impacts from the "Town of Martin" project. Will schedule another meeting and bring H&H engineers for Floyd and Martin projects to answer questions. Tammy Conforti and Steve O'Leary attended. About 11 people from Allen attended.
June 21, 2005	Public Meeting – Allen – City Hall	Attendees: Ted Hamb, Steve Radcliff, Steve O'Leary, Tammy Conforti, Mayor Sharon Woods and 8 other residents from Allen. Discussions focused around impacts from "Town of Martin" project.

7.2 Institutional Involvement

Input from Federal, state, and local agencies and public officials has resulted from a combination of correspondence and consultation meetings. Early coordination letters were sent to the following agencies in March 2004:

Natural Resources Conservation Service
Mr. Christopher Slone, District Conservationist
Prestonsburg Service Center
214 S Central Avenue
Prestonsburg, Kentucky 41653-1953

US Department of the Interior
Fish and Wildlife Service
Mr. Lee Andrews, Field Supervisor
3761 Georgetown Road
Frankfort, Kentucky 40601

Federal Emergency Management Agency
Region IV, 3003 Chamblee Tucker Road
Atlanta, Georgia 30341

Appalachian Regional Council
1666 Connecticut Ave. NW, Suite 700
Washington, DC 20009

Kentucky Transportation Cabinet
Highway District 12
109 Loraine Street · Pikeville, Kentucky 41501

Kentucky Dept. of Environmental Protection
14 Riley Road
Frankfort, Kentucky 40601

Kentucky Division of Water
Danny Peete
18 Riley Road
Frankfort, Kentucky 40601

Kentucky Heritage Council
State Historic Preservation Officer
Mr. David L. Morgan, Director
300 Washington Street
Frankfort, Kentucky 40601

Kentucky Dept. of Fish & Wildlife Resources
Mr. Wayne L. Davis
No. 1 Game Farm Road
Frankfort, Kentucky 40601

East Kentucky Economic Development Division
Steve Carter, Director
P.O. Box 49. 530 South Lake Dr.
Prestonsburg, KY 41653

Big Sandy Area Development District
100 Resource Drive
Prestonsburg, Kentucky 41653

An on-site project scoping meeting was conducted on June 29, 2004 and June 15, 2005 with representatives of the US Fish and Wildlife Service (USFWS), Kentucky Department of Fish and Wildlife Resources, and Kentucky Division of Water (KDOW). An additional meeting were held December 1, 2005 to discuss project updates and mitigation approaches.

Ongoing consultation with the Kentucky Historic Preservation Office has resulted in a draft memorandum of understanding regarding cultural resources within the study area.

7.3 Additional Required Coordination

The USACE is responsible for obtaining Federal, state, and local permits required in order to implement the proposed action. The Fish and Wildlife Coordination Act– (16 United States Code (USC) § 661 et seq.) sets forth required coordination between the USACE and the USFWS. This legislation authorizes the Secretary of the Interior, through the USFWS to assist and cooperate with Federal, state and public or private agencies and organizations in the conservation and rehabilitation of wildlife. 16 USC 662(a) requires the USACE to consult with the USFWS and the state wildlife agency when proposing changes to streams or other bodies of water. The agencies' reports and recommendations are to be included in authorization documents for project construction or modification. The USACE is required to give full consideration to these reports and recommendations, and include wildlife mitigation or enhancement as justified to obtain maximum overall project benefits.

Continued coordination and informal collaboration with the USFWS has resulted in a detailed understanding of the existing habitat and potentially adverse impacts to both aquatic and terrestrial resources in the Levisa Fork basin within the proposed study area. The analysis and interpretation of this information has allowed for productive discussion and significant progress toward developing mitigation measures to compensate for ecological impacts of the preferred alternative. A formal Fish and Wildlife Coordination Act Report will be included in the Final EIS.

7.4 DEIS Distribution List

The DEIS is being circulated to the following agencies, officials, organizations, and individuals.

7.4.1 Federal Agencies and Elected Officials

United States Senator

Honorable Mitch McConnell
361A Russell Senate Office Building
Washington, DC 20510

Honorable Jim Bunning
316 Hart Senate Office Building
Washington, DC 20510

Representative in Congress

Honorable Hal Rogers
2406 Rayburn Building
Washington, DC 20515

Dr. Gerald Miller, Environmental Scientist
US Environmental Protection Agency
Atlanta Federal Center, 61 Forsyth Street, SW
Atlanta, Georgia 30303-3104

US Environmental Protection Agency
Office of Federal Activities
EIS Filing Section
Mail Code 2252-2, Room 7241
Ariel Rios Building (South Oval Lobby)
1200 Pennsylvania Avenue, NW
Washington, DC 20004

Federal Highway Administration
400 Seventh Street, SW
Washington, DC 20590

Advisory Council on Historic Preservation
1100 Pennsylvania Avenue NW, Suite 809
Old Post Office Building
Washington, DC 20004

US Department of Agriculture
Natural Resources Conservation Service
District Conservationist
Prestonsburg Service Center
214 S Central Avenue
Prestonsburg, Kentucky 41653-1953

US Department of Health and Human Services
200 Independence Avenue, SW
Washington, DC 20201

US Department of Housing and Urban Development
451 7th Street SW
Washington, DC 20410

US Department of the Interior
Team Leader, Natural Resources Management
Office of Environmental Policy and Compliance
1849 C Street, N.W. Room 2340
Washington, DC 20260

US Department of the Interior
Fish and Wildlife Service
Mr. Lee Andrews, Field Supervisor
3761 Georgetown Road
Frankfort, Kentucky 40601

Federal Emergency Management Agency
500 C Street, SW
Washington, DC 20472

Region IV
3003 Chamblee Tucker Road
Atlanta, Georgia 30341

Appalachian Regional Council
1666 Connecticut Ave. NW, Suite 700
Washington, DC 20009

7.4.2 State Agencies and Elected Officials

Office of the Governor
Governor Ernie Fletcher
700 Capitol Avenue
Frankfort, Kentucky 40601

Senate District - 29
Senator Johnny Ray Turner
P.O. Box 5
Drift, KY 41619

House District 97
Representative Hubert Collins
72 Collins Drive
Wittensville, KY 41274

House District 95
Representative Charles E. 'Chuck' Meade
P.O. Box 222
Allen, KY 41601

Kentucky Transportation Cabinet
501 High Street
Frankfort, Kentucky 40622

Department for Local Government
Capital Complex East Building
1024 Capital Center Drive, Suite 340
Frankfort, Kentucky 40601

Kentucky Appalachian Commission
The Appalachian Center
University of Kentucky
624 Maxwelton Court
Lexington, Kentucky 40506-0347

Kentucky Dept. of Environmental Protection
Mr. Boyce Wells, State Environmental Review Officer
KY Environmental & Public Protection Cabinet
14 Riley Road
Frankfort, Kentucky 40601

7.4.3 Local Agencies and Elected Officials

Floyd County Government
Lon May
Floyd County Fiscal Court
313 Westminster Street
Prestonsburg KY 41653

Paul Thompson
Floyd County Judge Executive
P.O. Box 1089
County Courthouse
Prestonsburg, KY 41653-5089

City Government Offices
Mayor Jerry S. Fannin
200 North Lake Drive
Prestonsburg, Ky. 41653

Michael L. Ormerod, Director of Public Safety
200 North Lake Drive
Prestonsburg, Ky. 41653

Prestonsburg City Fire Department
200 N Lake Drive
Prestonsburg, KY41653

Local Agencies
Big Sandy Area Development District
100 Resource Drive
Prestonsburg, Kentucky 41653

Floyd County Chamber of Commerce
113 South Central Avenue
P.O. Box 1508
Prestonsburg, Kentucky 41653

7.4.4 Organizations and Individuals

Sierra Club
c/o Oscar Geralds, Jr.
257 West Short Street
Lexington, Kentucky 40507

CSX Transportation Services
500 Water Street
Jacksonville, Florida 32202

7.4.5 Public Libraries

Floyd County Public Library
18 North Arnold Avenue
Prestonsburg, KY 41653-1269

Prestonsburg Community College Library
One Bert T. Combs Drive
Prestonsburg, KY 41653

CHAPTER 8. LIST OF PREPARERS

The EIS was prepared under the supervision of the USACE, Huntington District. The individuals who contributed to the preparation of the document are listed below, with their organization, education, years of experience, and project role.

U.S. Army Corps of Engineers, Huntington District

Aya-ay, Jay, USACE
MA, Biological Sciences, BA, Biology – 6 years
Lead EIS Coordinator

Jackson, Brantley, RPA , USACE
MA Anthropology - 40 years
Reviewer-Cultural Resources

Preston, John, USACE
B.S. Forest Resource Management – 25 years
Technical Reviewer

Radcliff, Steven, USACE
MS Environmental Engineering - 14 years
Formulations

Hamb, Theodore, P.E., USACE
Engineering

Drum, Gus, USACE
Community Planner – 30 years
Document Review

Cline, John, USACE
Law – 25 years
Legal Review

AMEC Earth & Environmental, Inc.

Barbo, Dean, AMEC
MS Forestry – 7 years
GIS and Graphics

Marchaterre, Martin, JD
JD – 17 years
Document Review

Phillips, Kelly, AMEC
BS, Earth Science - 5 years
Water Resource Field Investigations

Sabraoui, Rebecca, AMEC
BSEng, Chemical - 13 years
Consultant Team EIS Coordinator

Walker, Mary Motte, AMEC
MS, Forest Resources - 4 years
Terrestrial Resources

Warf, Jennifer, AMEC
MS, Environmental Studies – 5 years
Aquatic and Terrestrial Resources, Document Preparation

Zopff, David, PE, AMEC
BSE Chemical - 17 years
Air Quality and Noise

Parsons Brinkerhoff

Wade, Traci L, AICP, Parsons Brinkerhoff
BA Sociology, MS, Urban Planning - 5 years
Socioeconomics, Community Cohesion

CHAPTER 9. REFERENCES AND BIBLIOGRAPHY

Allen, A.W.

1984 Habitat Suitability Index Models: Eastern Cottontail. U.S. Fish and Wildlife Service FWS/OBS-82/10.66.

1982 Habitat Suitability Index Models: Gray Squirrel. U.S. Fish and Wildlife Service FWS/OBS-82/10.19.

1987 Habitat Suitability Index Models: Barred Owl. U.S. Fish and Wildlife Service Report 82 (10.143).

Anderson, D. G. and K. E. Sassaman

1996 *The Paleoindian and Early Archaic Southeast.* The University of Alabama Press.

Anslinger, Michael C.

1988 Bluegrass: A Middle-Late Archaic Site in Southwestern Indiana. Paper presented at the 60th Annual Midwest Archaeological Conference, University of Illinois, Urbana.

AMEC

2006 Ecological Summary Report, Floyd County Section 202 Flood Damage Reduction Project, prepared for the United States Army Corps of Engineers, draft, March 2006.

2004 Ambient Noise Measurements, Levisa Fork (Floyd County) Section 202 Project Documentation.

American Meterological Society

2000 *Glossary of Meteorology*, *Second Edition,* Allen Press, 2000. http://www.usace.army.mil/inet/usace-docs/

Amos, C.

1995 <u>A Historic and Architectural Reconnaissance and Survey for the Levisa Basin Flood Control Project, Western Virginia and Eastern Kentucky</u>. Report prepared for the U.S. Army Corps of Engineers, Huntington District.

Bailey, Pamela

2004 Vascular Plant Survey for Floyd County Section 202 Project, Prestonsburg, Kentucky, Environmental Laboratory, U.S. Army Engineer Research and Development Center, Vicksburg, MS 39180-6199.

Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid bioassessement protocols for use in wadeable streams and rivers: periphyton, benthic macroinvertebrates, and fish (2nd edition). The United States Environmental Protection Agency, Washington, D.C. EPA 841-B-99-002.

Big Sandy Economic Development District (BSADD)

2003 Update to Big Sandy Comprehensive Economic Development Strategy.

<http://www.bigsandy.org/Ceds/ceds2003/>.

2002 Big Sandy Comprehensive Economic Development Strategy. <http://www.bigsandy.org/Ceds/ceds2002/>.

Bureau of Land Management (BLM)
2000 Draft RMPA/EIS for Federal Fluid Minerals Leasing and Development in Sierra and Otero Counties. Page 4-29.

Childress, James
2005 Gasification: The Enabling Technology, presented at the Gasification Technologies Conference, December 8, 2005. http://www.gasification.org

Collins, M. and B. Driskell
1979 Summary and Conclusions. In *Excavations at Four Archaic Sites in the Lower Ohio River Valley, Jefferson County, Kentucky*. edited by M. B. Collins, pp. 1023-1042. Occasional Papers in Anthropology No. 1. Department of Anthropology, University of Kentucky.
1980
Davis, Dan
1998 A Phase I Archaeological Survey of Two Alternate Routes for a 2.4 Mile Section of KY 114 Near Prestonsburg, Floyd County, Kentucky. University of Kentucky, Lexington.

DEFRA, 2003. The Appraisal Of Human-Related Intangible Impacts Of Flooding, United Kingdom Department For Environment, Food And Rural Affairs, DEFRA Project Code FD2005.

Drake, Richard B.
2001 *A History of Appalachia*. University of Kentucky Press, Lexington.

Dunnell, Robert C.
1966 *Archaeological Reconnaissance in Fishtrap Reservoir, Kentucky*. Department of Anthropology, Yale University, New Haven.

1972 The Prehistory of Fishtrap, Kentucky. *Yale University Publications in Anthropology* No. 75. Department of Anthropology, Yale University, New Haven, Connecticut.

Eller, Ronald D.
1982 *Miners, Millhands, and Mountaineers*. University of Tennessee Press, Knoxville.

Federal Emergency Management Agency (FEMA)
2002 Federal Insurance and Mitigation Administration, Federal Emergency Management Agency, National Flood Insurance Program Description, August 1, 2002. http://www.fema.gov/fima/nfip.shtm, accessed March 5, 2006.

Music, Mary
2005 "*Floyd, Pike Partner on $5 Million Sewer Plan*", Floyd County Times Mary Music, staff writer, 23 December 2005.

Glasmeier, Amy K.,
2006 "*Floyd County, Kentucky: Hardship, uncertainty, and hope characterize life in the coalfields"*, Penn State Poverty in America Project, Earth and Environmental Systems Institute, January 11, 2006, www.povertyinamerica.psu.edu, accessed March 8, 2006.

Hand, Robert B.
1994 *A Coal Mine Survey Near Prestonsburg in Floyd County, Kentucky.* Cultural Resources Analysts, Inc. Lexington.

1991 *A Coal Mine Survey along the West Side of Stratton Branch, Floyd County, Kentucky.* Cultural Resources Analysts, Lexington.

Hajat, Shakoor et al,
2003 The Human Health Consequences Of Flooding In Europe And The Implications For Public Health: A Review Of The Evidence, London School of Hygiene and Tropical Medicine, London, UK.

Henderson, A. G., C. E. Jobe, and C. A. Turnbow
1986 Indian Occupation and Use in Northern and Eastern Kentucky During the Contact Period (1540 - 1795): An Initial Investigation. Ms. on file, the Kentucky Heritage Council, Frankfort.

Jefferies, Richard W.
1996 Hunters and Gatherers After the Ice Age. In *Kentucky Archaeology,* edited by R, B. Lewis, pp. 39-77. University of Kentucky Press, Lexington.

1990 Chapter 4: The Archaic Period. In *The Archaeology of Kentucky: Past Accomplishments and Future Directions,* edited by David Pollack, Kentucky Heritage Council, Frankfort.

Justice, Noel D.
Stone Age Spear and Arrow Points of the Midcontinental and Eastern United States: A Modern Survey and Reference. Indiana University Press, Bloomington.

Kentucky Administrative Regulations
401 KAR 50:010. Attainment status designations.
401 KAR 50:020. Air quality control regions.

Kentucky Cabinet for Economic Development
2004 Floyd County Community Information, Economic Development Information System. January 20, 2004. http://www.thinkkentucky.com/kyedc/topten.asp.

Kentucky Division of Water and the Rivers, Trails, and Conservation Assistance Program of the National Park Service.
1992 Kentucky Rivers Assessment.

Kentucky Geological Survey
2005 Ground-Water Resources of Floyd County, Kentucky, Daniel I. Carey, John F. Stickney, County Report 36, Series XII ISSN 0075-5567.

Kentucky National Resources and Environmental Protection Cabinet, Department for Environmental Protection,
2002 Methods for Assessing Biological Integrity of Surface Water, Kentucky Division of Water.

2002a Methods for assessing biological integrity of surface waters. Division of Water, Ecological Support Section, Frankfort, KY.

2002b Kentucky Ambient Air Quality Annual Report, Division for Air Quality.

2003 303(d) List of Water for Kentucky, Kentucky Division of Water.

2004 Species Information for Floyd County, Kentucky Department of Fish and Wildlife Resources <http://www.kdfwr.state.ky.us/kfwis/speciesInfo/speciesInfo.asp>

Kentucky State Historic Preservation Office (KY SHPO)
2001 Specifications for Conducting Fieldwork and Preparing Cultural Resource Assessment Reports . Kentucky Heritage Council. Frankfort.

Kentucky State Nature Preserves Commission.
2002 County Report of Endangered, Threatened, and Special Concern Plants, Animals, and Natural Communities of Kentucky.

2002a Kentucky's Native Flora Status and Trends in Rare Plants. (http://www.kynaturepreserves.org/etsquery.asp) Kentucky State Nature Preserves Commission, KY.

Kentucky Transportation Cabinet
2005 Traffic Counts, Floyd County, November 2005. Division of Planning.

2005a Traffic Counts, Prestonsburg, Floyd County, November 2005. Division of Planning.
Kentucky Water Resources Research Institute
2001 PRIDE Water Quality Assessment Report: Problems and Programs.

Kleber, J.E. (editor). 1992. The Kentucky Encyclopedia. The University Press of Kentucky, Lexington. 721pp.

Libby, Gary W.
2004 Survey of Potential Winter Habitat Sites for Indiana Bat, Levisa Fork (Floyd County) Section 202 Project Structural Areas, Eco-Tech.

Libby, Gary W., James E. Spencer, Hal D. Bryan, P. Lee Droppelman, Shawn M. Cochran, and Rebecca D. M. Smith.

2002 Terrestrial and Aquatic Ecological Assessment for the Proposed US 23 Congestion Relief Build Alternatives, Pike County, Kentucky. Prepared for QK4, Louisville, Kentucky and Kentucky Transportation Cabinet Frankfort, Kentucky, Item Number: 12-131.00.

Lewis, R. Barry
1996 *Kentucky Archaeology*. The University Press of Kentucky, Lexington.

McBride, K. A. and W. S. McBride
1990 Chapter 9: Historic Period Culture History. In *The Archaeology of Kentucky: Past Accomplishments and Future Directions, v*ol. 2,edited by D. Pollack, pp. 583-747. Kentucky Heritage Council, State Historic Preservation Comprehensive Plan Report No. 1. Kentucky Heritage Council, Frankfort.

Moore, Rose G.
2001 *An Archaeological Survey of the Proposed Stratton Branch Boat Ramp, Jenny Wiley State Park, Floyd County, Kentucky.* Cultural Resources Analysts, Inc.,Lexington.

Morton Arboretum
2006 Plants Tolerant of Black Walnut Toxicity, Fact Sheet. Accessed March 8, 2006. http://www.mortonarb.org/plantinfo/plantclinic/Selection_BlackWalnutToxicity.pdf

Morton, J.M
1992 Assessment of 13 Streams as Sites to Mitigate Impacts of the Proposed Haysi Reservoir. U.S. Fish and Wildlife Service.

Norman, Janet
1995 A Preliminary Fish and Wildlife Coordination Act Report, Levisa Fork Basin Flood Damage Reduction Plan. U.S. Fish and Wildlife Service.

1997 A Preliminary Fish and Wildlife Coordination Act Report, Levisa Fork Basin Flood Damage Reduction Plan. U.S. Fish and Wildlife Service.

1998 Levisa Fork Basin Flood Damage Reduction Plan: Final Fish and Wildlife Coordination Act Report. U.S. Fish and Wildlife Service.

Ogle, D.W.
1992 *Spiraea Virginiana* Recovery Plan. Virginia Highlands Community College, Abington, VA.

1995 *Spiraea Virginiana* Survey, Levisa Fork Basin Flood Damage Reduction Plan in Kentucky and Virginia. Prepared for the U.S. Army Corps of Engineers, Huntington District, WV. Virginia Highlands Community College, Abington, VA.

O.Malley, Nancy
1989 *The Derossett-Johns Site: A Historic Archaeological Study in Prestonsburg, Floyd County, Kentucky.* University of Kentucky, Lexington.

Parsons Brinkerhoff
2004 Community Cohesion and Social Impact Study, Final Report, Floyd County, Kentucky, Levisa Fork. Prepared for U.S. Army Corps of Engineers, Huntington District, WV.

Peterson, Ryan
2002 *Intensive Phase I Archaeological Investigation of a Proposed Access Road Near Jenny Wiley State Park, Floyd County, Kentucky (KYTC Item No. 12-328.00).* AMEC Earth & Environmental, Inc., Louisville.

Pollack, D., Editor
1990 *The Archaeology of Kentucky: Past Accomplishments and Future Directions*, vol. 1. Kentucky Heritage Council, State Historic Preservation Comprehensive Plan Report No. 1. Kentucky Heritage Council, Frankfort.

Prufer, Olaf H. and D. H. McKenzie
1967 Peters Cave: Two Woodland Occupations in Ross County, Ohio. *Ohio Journal of Science* 66(3): 333-353. Columbus, Ohio.

Railey, J. A.
1990 Chapter 5: Woodland Period. In *The Archaeology of Kentucky: Past Accomplishments and Future Directions*, vol. 1, edited by D. Pollack, pp. 247-374. Kentucky Heritage Council, State Historic Preservation Comprehensive Plan Report No. 1. Kentucky Heritage Council, Frankfort.

1996 Mississippian Farmers. In *Kentucky Archaeology,* Edited by Barry Lewis, pp. 39-78. University of Kentucky Press.

Raitz, Karl B. and Richard Ulack
1984 *Appalachia: A Regional Geography*. Westview Press, Boulder.

Richmond, Michael D.
1996 *An Archeological Survey in Jenny Wiley State Park, Floyd County, Kentucky.* Cultural Resources Analysts, Inc. Lexington.

Rodrigue, J.P et al.
2006 The Geography of Transport Systems, Hofstra University, Department of Economics & Geography, http://people.hofstra.edu/geotrans.

Sanders, T. N. and T. W. Gatus
1977 A Reconnaissance and Evaluation of Archaeological Sites in Floyd County, Kentucky. Archaeological Survey Report No. 7. KHC.

Schock, Jack M.
1989a *An Archaeological Survey of Approximately 17 Miles for a Proposed Powerline from Prestonsburg to Paintsville in Floyd and Johnson Counties, Kentucky*. Arrow Enterprises.

1989b *An Archaeological Survey of Approximately 13 Miles for a Proposed Powerline from Prestonsburg to Sublett in Floyd and Magoffin Counties, Kentucky*. Arrow Enterprises.

Schoeder, R.L.
1982 Habitat Suitability Index Models: Downy Woodpecker. U.S. Fish and Wildlife Service FWS/OBS-82/10.38.

Schwartz, Douglas W.
1962 *An Archaeological Survey of the Fishtrap Reservoir*. Report on File at the Office of State Archaeology. Lexington, Kentucky.

Sharp, W. E.
1990 Chapter 7: Fort Ancient Period. In *The Archaeology of Kentucky: Past Accomplishments and Future Directions*, vol. 2, edited by D. Pollack, pp. 467-558. Kentucky Heritage Council, State Historic Preservation Comprehensive Plan Report No. 1. Kentucky Heritage Council, Frankfort.

1996 Fort Ancient Farmers. In *Kentucky Archaeology*, edited by R. B. Lewis, pp. 161-182. The University of Kentucky Press. Lexington.

Tipler, P.A.
1976 <u>Physics.</u> Worth Publishers. New York, New York.

United States Army Corps of Engineers (USACE)
1982 Tug Fork Valley Flood Damage Reduction Plan, Appendix H, Environmental Design and Mitigation General Design Memorandum. Huntington, WV.

1982a Tug Fork Valley Flood Damage Reduction Plan, Main Report and EIS, General Design Memorandum. Huntington, WV.

1987 Mitigation Plans for the Levisa Fork Valley Flood Reduction Study. Huntington, WV.

1988 Dean, Wallace E., Levisa Fork Basin General Planning Memorandum: Appendix C, Environmental Baseline Conditions, Supplement to Section 202 General Plan.

1988a Maslowski, Dr. Robert F., Levisa Fork Basin General Planning Memorandum: Appendix B, Social and Cultural Resources

1990 Dean, Wallace E. Section 202 Flood Damage Reduction Plan, Levisa Fork Basin/Haysi Dam Project, Preliminary Draft Environmental Impact Statement (DEIS). Huntington, WV.

1990a Dean, Wallace E., Haysi Dam and Reservoir Russell Fork River, VA, Environmental Development Plan. 1990. U.S. Army Corps of Engineers, Huntington District, Huntington, WV.

1994 Hazardous, Toxic, and Radioactive Waste for the EIS Report. Huntington, WV.

1996 Appendix L: Levisa Fork Valley Flood Control Project: Compensatory Mitigation Plan. Huntington, WV.

1996b <u>Addressing Borrow and Disposal Areas in NEPA, Feasibility Level, and Applicable Design Documents</u>, Memorandum from Alexander R. Jansen, CEORD-ET-PF, July 9, 1996.

1997 Section 202 Flood Damage Reduction Plan for the Levisa Fork Basin Haysi Dam Project, Draft of the General Plan Supplement, Appendix B, Draft EIS. Huntington, WV.

1997b Public Meeting. Prestonsburg, Kentucky. June 5, 1997.

1997c Dial Cordy and Associates, Section 202 Flood Damage Reduction Plan, Levisa Fork Basin/Haysi Dam Project, Appendix B, Environmental Assessment and Mitigation Plan.

1998 Johnson, Charles R. Levisa Fork Basin General Planning Memorandum: Appendix I, Recreational Resources, Supplement to Section 202 General Plan.

1998a Section 202, Levisa Fork Flood Control Project, Final Environmental Impact Statement. Huntington, WV.

1988b Twohig, James B. Jr. Levisa Fork Basin General Planning Memorandum: Main Report and EIS, Supplement to Section 202 General Plan.

2000 Dean, Wallace E. “Town of Martin” Nonstructural Project, Detailed Project Report, Appendix T, Section 202 General Plan, Environmental Assessment. Huntington, WV.

2000a U.S. Army Corps of Engineers, Jacksonville District. 2000a. Levisa Fork Flood Control Project, Final EIS, Independent Technical Review. Huntington, WV.

2001 Dean, Wallace E., Section 202 General Plan Nonstructural Project: Appendix U Buchanan County, Virginia, Levisa Fork Basin, Volume 6, Final Environmental Assessment. Huntington, WV.

2003 Corps of Engineers Ohio River Division Regulation (CEORD-R) 1105-2-404, *Planning Civil Works Projects Under the Environmental Operating Principals*, effective May 1, 2003

2003a Dean, Wallace E., Final Environmental Assessment, Section 202 General Plan Nonstructural Project, Dickenson County, Virginia, Levisa Fork Basin. Huntington, WV.

2003b July 2003. Lower Mud River at Milton, WV, Draft Limited Reevaluation Report and Environmental Impact Statement – Supplement 1.0. Huntington, WV.

2003c ER 200-1-5, Environmental Quality – Policy for Implementation and Integrated Application of the U.S. Army Corps of Engineers Environmental Operating Principles and Doctrine.

2004 Pike County Kentucky, Levisa Fork Basin Flood Damage Reduction Project, Appendix W: Section 202 General Plan, Volume 1, Detailed Project Report. Huntington, WV, October 2004.

2005 HEC-RAS Modeling, Levisa Fork within Floyd County, data prepared by US Army Corps of Engineers, Huntington District, December 2005.

United States U.S. Census Bureau
2000 Dicennial U.S. Census and County Business Patterns 1998-2001.

United States Code of Federal Regulations
2001 Noise Abatement and Control, Housing and Urban Development, 24 CFR 51 B, April 2001.

United States Department of Agriculture (USDA),
2005 National Agricultural Statistics Service, Kentucky Field Office Kentucky Agricultural Statistics 2004-2005 Bulletin.

……….Natural Resources Conservation Service (NRCS)

1996 Farmland Conversion Impact Ratings for Haysi Dam Project, Floyd County, correspondence from Jim Rospapo.

2000 Soil Survey of Floyd County, Kentucky. United States Department of Agriculture Soil Conservation Service.

2004 The PLANTS Data Base, Version 3.5 (http:// plants.usda.gov) National Plant Data Center, Barton Rouge, LA 70874-4490 USA.

United States Environmental Protection Agency (USEPA)
1971 Office of Noise Abatement and Control. July 8-9, 1971. Public Hearings for Noise Abatement and Control, Vol. I: Construction Noise. Atlanta, GA.

1974 Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, EPA/ONAC 550/9-74-004.

1997 EPA 841-B-97-003, Volunteer Stream Monitoring: A Methods Manual, November 1997.

1999 NAAQS Information and Standards. Office of Air Quality Planning and Standards. http://www.epa.gov/oar/oaqps, August 1999.

2003 Technology Transfer Network, County Emission Summaries by Source Category, EI T-3 NET96, Floyd County, Kentucky.

United States Geological Survey (USGS)
1967 Geologic Quadrangle Map, Prestonsburg, Kentucky.

2002 Ecoregions of Kentucky (color poster with map, descriptive text, summary tables, and photographs). Woods, A.J., Omernik, J.M., Martin, W.H., Pond, G.J., Andrews, W.M., Call, S.M, Comstock, J.A., and Taylor, D.D. Reston, VA. Map scale 1:1,000,000.

2006 Peak Streamflow for Kentucky, USGS 03209500 LEVISA FORK AT PIKEVILLE, KY, http://nwis.waterdata.usgs.gov/ky/nwis/peak?site_no=03209500&agency_cd=USGS&format=html, accessed March 6, 2006.

Wastetron, Inc.
2003 Phase I Site Investigation for Floyd County Section 202 Structural Areas. Prepared for U.S. Army Corps of Engineers.

Witt, James Lee
1999 Testimony of James Lee Witt, Director, Federal Emergency Management Agency, Before the Subcommittee on Housing and Community Opportunity Committee on Banking And Financial Services United States House of Representatives Washington, D.C. October 27, 1999.

CHAPTER 10. ACRONYMS AND GLOSSARY

10.1 Acronyms Used

ACHP	Advisory Council on Historic Preservation
ACM	Asbestos-containing Material
ADNL	A-weighted Day-Night Level
AEP	American Electric Power
AFS	Air Facility System
AGL	Above Ground Level
AHPA	Archaeological and Historic Data Preservation Act
AIRFA	American Indian Religious Freedom Act
AMEC	AMEC Earth and Environmental, Inc
AMSL	Above Mean Sea Level
ARPA	Archaeological Resources Protection Act
AST	Aboveground Storage Tank
ASA (CW)	Assistant Secretary of the Army for Civil Works
bgs	Below Ground Surface
BFE	Base Flood Elevation
BHP	Bureau of Historic Preservation
BLM	US. Department of Interior, Bureau of Land Management
BMP	Best Management Practice
BSADD	Big Sandy Area Development District
BSCTC	Big Sandy Community and Technical College
C-2	General Business District
C&O	Chesapeake and Ohio
CAA	Clean Air Act of 1970
CAAA	Clean Air Act Amendments of 1990
CAH	Cold Water Aquatic Habitat
CDNL	C-weighted Day-night Level
CEORD	Corps of Engineers Ohio River Division
CEORD-R	Corps of Engineers Ohio River Division Regulation
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
Cfs	Cubic Feet Per Second
CO	Carbon Monoxide
C & O	Chesapeake & Ohio railroad
CSX	CSX Transportation
CWA	Clean Water Act of 1977
CWL	Construction Work Limits
DAQ	Division for Air Quality
dB	Decibels
dBA	A-weighted Sound Level in Decibels
dbh	Diameter at Breast Height
dBP	Decibels Peak
DEIS	Draft Environmental Impact Statement
DNL	Day-Night Level
DPR-1	Detailed Project Report 1
DOT	Department of Transportation
DSS	Decent, Safe and Sanitary
DWS	Domestic Water Supply
EA	Environmental Assessment
EEP	Emergency Evacuation Plan
EFARS	Engineer Federal Acquisition Regulation Supplement
EKSAP	District Eastern Kentucky Stream Assessment Protocol
EII	Ecological Integrity Index
EIU	Ecological Integrity Units
EIS	Environmental Impact Statement
EPCRA	Emergency Planning and Community Right-To-Know Act
EPPC	Environmental and Public Protection Cabinet
EMS	Emergency Services
EO	Executive Order
EPA	Environmental Protection Agency
ER	Engineer Regulation
ESA	Endangered Species Act of 1973

F	Fahrenheit
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	U.S. Department of Transportation, Federal Highway Administration
FICON	Federal Interagency Committee on Noise
FICUN	Federal Interagency Committee on Urban Noise
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act of 1981
Fps	Feet Per Second
ft	Feet
FWCA	Fish and Wildlife Coordination Act
FWEEP	Flood Warning and Emergency Evacuation Plan
FWPCA	Federal Water Pollution Control Act
FY	Fiscal Year
GDM	General Design Memorandum
GIS	Geographic Information System
GP	General Plan
GPD	Gallons Per Day
GPM	General Plan Memorandum
gpm	Gallons Per Minute
GPS	General Plan Supplement
GPS	Global Positioning System
H&CD	Housing and Community Development
HAPs	Hazardous Air Pollutants
HEC-RAS	Hydrologic Engineering Centers River Analysis System
HEP	Habitat Evaluation Procedure
HIS	Habitat Suitability Index Model
HTRW	Hazardous, Toxic, and Radioactive Waste
HQUSACE	Headquarters of the United States Army Corps of Engineers
HUD	U.S. Department of Housing and Urban Development
IFLOWS	Integrated Flood Observing and Warning System
IPMP	Initial Project Management Plan
KAR	Kentucky Administrative Regulations
KDFWR	Kentucky Department of Fish and Wildlife Resources
KDOW	Kentucky Division of Water
KGS	Kentucky Geological Survey
KRS	Kentucky Regulatory Statute
KSNPC	Kentucky State Nature Preserves Commission
KW	Kilowatt
KY-EPPC	Kentucky Exotic Pest Plant Council
KYTC	Kentucky Transportation Cabinet
L_{dn}	Day-night Sound Level
L_{eq}	Equivalent Sound Level
L_{min}	Minimum Sound Level
L_{max}	Maximum Sound Level
Ls	Sound Exposure Level
LPP	Local Protection Project
M	Million
MACT	Maximum Achievable Control Technology
mgd	Million Gallons Per Day
Mo	Melvin Silt Loam
µS/cm	Microsiemens Per Centimeter
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NAGPRA	Native American Graves Protection and Repatriation Act
NED	National Economic Development
NEPA	National Environmental Policy Act
NER	National Ecosystem Restoration
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act of 1966
NIPTS	Noise-Induced Permanent Threshold Shift
NMFS	National Marine Fisheries Service
NO_2	Nitrogen Dioxide
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service

NR	National Register of Historic Places
NRCS	Natural Resource Conservation Service
NS	Nonstructural
N & W	Norfolk & Western Railroad
NWI	National Wetland Inventory
O3	Ozone
ORW	Outstanding Resource Water
OSA	Office of State Archaeology
O&M	Operations and Management
OSHA	Federal Occupational Safety and Health Administration
Pb	Lead
PCA	Project Cooperation Agreement
PCR	Primary Contact Recreation
PEM	Palustrine Emergent Wetland
PL	Public Law
PM_{10}	10 Micrometer Particulate Matter
$PM_{2.5}$	2.5 Micrometer Particulate Matter
PPA	Pollution Prevention Act
PSA	Public Service Agreement
R-1	Single and Double Family Dwellings
RBP	Rapid Bioassessment Protocol
RCRA	Resource Conservation and Recovery Act
RDDR	Relocation Design Document Report
RM	River Mile
ROW	Right of Way
S	Structural
SARA	Superfund Amendments and Reauthorization Act
SCR	Secondary Contact Recreation
SDWA	Safe Drinking Water Act
SFHA	Special Flood Hazard Areas
Sh	Shelbiana Loam
SHPO	State Historic Preservation Office
SHWS	State Hazardous Waste Sites
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SPF	Standard Project Flood
SPR	Specific Project Reports
TTS	Temporary Threshold Shift
US	US Highway
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRAP	Visual Resource Assessment Procedure
WAH	Warm Water Aquatic Habitat
WQC	Water Quality Certification
WRDA	Water Resources Development Act
WRDC	Water Resource Development Commission
WSRA	Wild and Scenic Rivers Act
WTP	Wastewater Treatment Plant

10.2 Glossary

One Percent Chance Flood – Commonly referred to as the 100-Year Frequency Flood Event - A flood event that statistically has a 1 out of 100 (or one percent) chance of being equaled or exceeded on a specific watercourse in any given year.

32 CFR – Code of Federal Regulations, Title 32. See *Code of Federal Regulations*.

40 CFR – Code of Federal Regulations, Title 40. See *Code of Federal Regulations*.

500-year Flood – A flood event of such magnitude that it occurs, on average, every 500 years; this equates to a 0.2 percent chance of its occurring in a given year.

Abatement - Reducing the degree or intensity of, or eliminating, pollution.

Acidification – The reduction of the pH in soil, waterways, and lakes as a result of the deposition of atmospheric pollutants containing acid forming substances such as, sulfur dioxide, nitrogen oxides, and ammonia.

Acid Mine Drainage – Drainage of water from areas that have been mined for coal of other mineral ores; the water has low pH, sometimes less than 2.0 (is acid), because of its contact with sulfur-bearing material; acid drainage is harmful because it often kills aquatic organisms

Acre-Foot - The volume of water that will cover one acre to a depth of one foot.

Acoustic - Pertains to hearing and sound.

Acute - Occurring suddenly or over a short period of time.

Adverse Effect - An effect that impairs or damages the environment, including an adverse effect respecting the health of humans or the reasonable enjoyment of life or property.

Aesthetics – Pertaining to the quality of human perception of natural beauty. See *Visual Resources*.

Affected Environment – For this EIS, Affected Environment refers to a description of the existing environment covering information that relates directly to the scope of the Proposed Action, the No-Action Alternative, and the implementing alternatives being analyzed (i.e., the information necessary to assess or understand the impacts). This description must contain enough detail to support the impact analysis. The information must highlight "environmentally sensitive resources," if present; these include floodplains and wetlands, threatened and endangered species, prime and unique agricultural lands, and property of historic, archaeological, or architectural significance.

Air Quality – A measure of the concentrations of pollutants, measured individually, in the air.

Alignment - The arrangement of the parts of a system to support the overall purpose of the system.

Alluvial Fan - A sloping, fan shaped mass of sediment deposited by a stream where it emerges from upland onto a plain.

Alternative – One of two or more actions, processes, or propositions from which a decision maker will determine the course to be followed. The National Environmental Policy Act, as amended, states that an agency, in preparing an EIS, "shall ... study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources" [42 U.S.C. 4321, Title I, Section 102 (E)]. Regulations of the Council on Environmental Quality that implement the National Environmental Policy Act indicate that the alternatives section in an EIS is "the heart of the environmental impact statement" (40 CFR 1502.14), and include rules for presenting the alternatives, including a No- Action Alternative, and their estimated impacts.

Ambient Air – The free flowing air outside of buildings.

Ambient Air Quality – The atmospheric concentration of a specific compound (amount of pollutants in a specified volume of air) actually experienced at a particular geographic location that may be some distance from the source of the relevant pollutant emissions.

Ambient Air Quality Standards – Standards established on a Federal or state level that define the limits for airborne concentrations of designated criteria pollutants (e.g., nitrogen dioxide, sulfur dioxide, carbon monoxide, particulate matter with aerodynamic diameters less than 10 microns (PM_{10}), ozone, and lead) to protect public health with an adequate margin of safety and to protect public welfare, including plant and animal life, visibility, and materials. See *Criteria Pollutants*.

Ammocoetes - The larval stage of the primitive lamprey.

Amphibian - Any of a class of vertebrates that regulate their body temperature externally; lay shell-less eggs in wet areas; live in water during early development and live both in water and on land as adults; and use lungs, gills and their skin for breathing.

Anaerobic - Not containing oxygen or not requiring oxygen.

Aquatic Life - Any species of plant or animal life, whether living or dead, which at any stage in its life history, must inhabit water.

Aquifer – An underground geological formation containing usable amounts of groundwater that can supply wells and springs.

Archaeology - The discovery, recovery, and study of material evidence or artifacts (i.e. structures, tools, clothing, implements and burial sites in various states of preservation) of past human life and culture.

Archaeologist – A scientist who studies past cultures by analyzing their artifacts (i.e., graves, buildings, tools, pottery).

Archaic period – 8000 B.C. to 1000 B.C.

Aeration - To be exposed to air; to cause air to circulate through a medium.

Agricultural – Includes cropland, tree nurseries, grazing land, pastures, orchards, tobacco fields, and other agricultural uses.

Asbestos - Either of two incombustible, chemical-resistant, fibrous mineral forms of impure magnesium silicate, used for fireproofing, electrical insulation, building materials, brake linings, and chemical filters. Asbestos is a carcinogenic substance.

Aspect – The direction that a slope faces.

Attainment Area – Region that meets the National Ambient Air Quality Standard (NAAQS) for a criteria pollutant under the Clean Air Act (CAA).

Backwater – A shallow, slow moving section of water with an elevation that is increased above normal because of a condition downstream such as a flood.

Bankfull – The water level at which a stream is just ready to overflow its banks.

Basin – The area drained by a river

Bedrock - The solid rock that underlies all soil or other loose material; the rock material that breaks down to eventually form soil.

Bench – A level plain, usually with a steep front, bordering a river, a lake, or sometimes the sea. A level, narrow stretch of land interrupting a declivity. Also referred to as a terrace.

Benches - One of to or more divisions of a coal seam separated by slate or formed by the process of cutting the coal.

Benthic Macroinvertebrates – Invertebrates that inhabit the bottom substrate, debris, logs, and plants of freshwater habitats for some part of their life cycle. These organisms play an essential role in the function of aquatic ecosystems by processing organic material and are crucial food items for many aquatic organisms, such as fish.

Berm - A mound of earth, located either away from a building, as a levee, or against the building wall.

Best Management Practices (BMPs) – Methods, measures, or practices to prevent or to reduce the contributions of pollutants. BMPs may be imposed in addition to, or in the absence of, effluent limitations, standards, or prohibitions.

Betterments - An improvement made to a piece of property that increases its value, rather than a repair that simply maintains its current value.

Biological Resources – A feature or component of the natural environment that is of value in serving human needs (e.g., soil, water, plant life, wildlife). Some natural resources have an economic value (e.g., timber), while others have a "noneconomic" value (e.g., scenic beauty).

Bituminous coal mines – Mines containing coal which is high in carbonaceous matter having a volatility greater than that of anthracite and a calorific value greater than that of lignite, often referred to as "soft coal" and is most abundant in the Eastern United States.

Borrow Area – An area of excavation outside the construction area to provide fill for earthwork.

Bottomland – Low-lying areas containing fertile soil near a stream or river which can be part of a floodplain and experience periodic flooding.

Bulkhead - A retaining wall designed to hold back water from bodies of water.

Canopy -The more or less continuous cover of leaves and branches in a forest, usually formed by the crowns of the dominant and codominant trees.

Carbon Monoxide – A colorless, odorless, poisonous gas produced by incomplete fossil-fuel combustion; one of the six pollutants for which there is a national ambient air quality standard.

Carrying Capacity - The limit of a natural or man-made system to absorb inputs.

Channel - 1. That part of a body of water deep enough for navigation through an area otherwise not suitable. It is usually marked by a single or double line of buoys and sometimes by range markers. 2. The deepest part of a stream, bay, or strait, through which the main current flows.

Channelization - The practice of straightening a waterway to remove meanders and make water flow faster.

Chronic - Continuing for a long period of time.

Cistern - A small tank or storage facility used to store water for a home or farm.

Clay – A mineral soil separate consisting of particles less than 0.002 millimeter in equivalent diameter.

Clean Air Act (CAA) – A Federal law that establishes Federal standards for various pollutants from both stationary and mobile sources, and provides for the regulation of polluting emissions via state implementation plans. The original Clean Air Act was passed in 1963, but our national air pollution control program is actually based on the 1970 version of the law. The 1990 Clean Air Act Amendments are the most far-reaching revisions of the 1970 law.

Clean Water Act (CWA) – A comprehensive statute aimed at restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. Enacted originally in 1948, the Act was amended numerous times until it was reorganized and expanded in 1972. It continues to be amended almost every year.

Clearing - Removal of vegetation (grass, brush, trees and similar plant types) by mechanical means.

Climate - The meteorological elements, including temperature, precipitation, and wind, that characterize the general conditions of the atmosphere over a period of time at any one place or region of the Earth's surface.

Climax Vegetation – The highest ecological development of a plant community capable of perpetuation under the prevailing climate conditions.

Coal – A readily combustible black to brownish-black sedimentary rock composed primarily of carbon that is extracted from the ground, as a fossil fuel, either by underground mining, open-pit mining or strip mining.

Coal Field - A large area of consistent coal deposition for which reserve calculations can be obtained; usually comprised of two or more deposits.

Code of Federal Regulations (CFR) – The CFR is the codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal Government. The purpose of the CFR is to present the official and complete text of agency regulations in one organized publication and to provide a comprehensive and convenient reference for all those who may need to know the text of general and permanent Federal regulations. The CFR is keyed to and kept up-to-date by the daily Federal Register. See *Federal Register*.

Colluvial Fan - Hillside deposit developed by mass movement of rock on slopes leading away from the exposed source rock .

Commercial - Includes stores, shops, hotels/motels, gas stations, convenience stores and apparent access, parking, loading and delivery areas.

Communicable Diseases - Diseases capable of being passed from one person to another.

Community – 1. A group of species of plants and/or animals living and interacting at a particular time and place. 2. A group of people residing in the same place and under the same government; spatially defined places, such as towns.

Community Cohesion – A sense of shared values and purpose, and a tolerance and acceptance of other residents.

Compaction - The packing of soil together into a firmer, more dense mass, generally caused by the pressure of great weight.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) – A Federal law that establishes a program to identify, evaluate, and remediate sites where hazardous substances may have been released (e.g., leaked, spilled, or dumped) to the environment.

Coniferous - Cone-bearing trees having needle or scale-like leaves, usually evergreen and producing wood known commercially as "softwoods."

Contaminants - Any physical, chemical, biological or radiological substances that have an adverse affect on air, water or soil.

Coral Reefs - Prominent oceanic features composed of hard, limy skeletons produced by coral animals; usually formed along edges of shallow, submerged ocean banks or along shelves in warm, shallow, tropical seas.

Corrosive - A substance that causes visible destruction or permanent changes in human skin tissue at the site of contact or is highly corrosive to steel.

Cost/Benefit Analysis - The process by which the value of a project is estimated based on the expected costs compared to the tangible benefits usually expressed as increased revenue, or reduced cost.

Council of Environmental Quality (CEQ) – An Executive Office of the President composed of three members appointed by the President, subject to approval by the Senate. Each member shall be exceptionally qualified to analyze and interpret environmental trends to appraise programs and activities of the Federal Government. Members are to be conscious of and responsive to the scientific, economic, social, esthetic, and cultural needs of the Nation, and to formulate and recommend national policies to promote the improvement of environmental quality.

Cove - A sheltered valley between opposing slopes.

Criteria Pollutants – Six common pollutants (ozone, carbon monoxide, particulates, sulfur dioxide, lead, and nitrogen dioxide) known to be hazardous to human health and environment and for which the U.S. Environmental Protection Agency sets National Ambient Air Quality Standards under the Clean Air Act.

Critical Habitat - A habitat determined to be important to the survival of a threatened or endangered species, to general environmental quality, or for other reasons as designated by the State or Federal government.

Cultivation – Production of food by preparing the land to grow crops.

Cultural Resources – The physical evidence of our Nation's heritage, including archaeological sites; historic buildings, structures, and districts; as well as localities with social significance to the human community.

Culvert - A drainage which crosses beneath a road.

Cumulative Effect – An impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions (40 CFR 1508.7).

dBA - A-weighted non-impulse noise measurement in decibels, weighted to match human hearing frequency response.

***de minimis* –** Lacking significance of importance; so minor as to be disregarded.

Decibel, A-weighted (dBA) – A measurement of sound approximating the sensitivity of the human ear and used to characterize the intensity or loudness of sound.

Decibel (dB) - A unit of measurement of sound pressure level (AR 200-1).

Deciduous – Plants having structures that are shed at regular intervals or at a given stage in development, such as trees that shed their leaves seasonally.

Dike - An embankment to confine or control water: a levee.

Direct Impact – A direct impact is caused by an action, and occurs at the same time and place. For direct impacts to occur, a resource must be present in a particular study area.

Dissolved Solids - A general indicator or contamination by inorganic materials.

Drainages - A natural system of drains that channel surface water.

Dredged Material – The bottom sediments that are excavated or dredged from waters of the United States.

Dredging – The removal of soil from the bottom of water bodies using a scooping machine.

Ecoregion - A relatively large unit of land or water that is characterized by a distinctive climate, ecological features and plant and animal communities

Ecosystem – A community of interacting organisms and their environment that functions together to sustain life.

Ecosystem Restoration - To reinstate an entire community of organisms to as near its natural condition as possible.

Effluent - Municipal sewage or industrial liquid waste (untreated, partially treated, or completely treated) that flows out of a treatment plant, septic system, pipe, etc.

Egress - A term concerning a right to come and go across the land (public or private) of another

Electromagnetic - Pertains to or exhibits magnetism produced by electric charge in motion

Elevation - Raising a building and placing it on a higher foundation so the first or lowest floor is above flood levels.

Emission – The release of air contaminants into the ambient air; the amount of one or more specific compounds introduced into the atmosphere by a source or group of sources.

Encroachment - An unauthorized invasion or intrusion of a fixture or other real property wholly or partly upon another's property, thus reducing the size and value of the invaded property.

Endangered Species – A plant or animal species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range.

Endangered Species Act (ESA) – A United States law, passed in 1973. Its purpose is to conserve threatened and endangered animals and plants and the ecosystems on which they depend. Species in need of conservation measures are placed on one of two lists: "endangered," in danger of extinction throughout all or a significant part of its normal range; or "threatened," likely to become an endangered species in the foreseeable future. The law prohibits the killing, shooting, wounding, hunting, capturing, harming, and harassing of a listed species. Court decisions have held that destroying habitat which injures or kills a species is also included.

Environmental – 1. In a scientific context, a combination of natural conditions. 2. In a planning context, a category of analytical studies of aesthetic values, ecological resources, cultural (historical) resources, sociological and economic conditions, etc.

Environmental Assessment/Environmental Impact Statement (EA/EIS) - An EA is a publication that provides sufficient evidence and analysis to show whether a proposed system will adversely affect the environment or be environmentally controversial. If the proposed system will adversely affect the environment or be controversial, an EIS is prepared to disclose impacts.

Environmental Health - Characteristics of health that result from the aggregate impact of both natural and man-made surroundings, including health effects of air pollution, water pollution, noise pollution, solid waste disposal, and housing; occupational disease and injuries; and those diseases related to unsanitary surroundings.

Environmental Impact – Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products, or services. An environmental impact addresses an environmental problem.

Environmental Justice – The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Environmental Mitigation – Measures taken to reduce adverse affects on the environment.

Environmental Sustainability – Management of human and natural resources in such a way that biological diversity and ecosystem health remain relatively steady into the future.

Erodible – Susceptible to erosion.

Erosion – The wearing away of land surface by wind and water.

Escarpment - A long cliff or steep slope separating two comparatively level or more gently sloping surfaces and resulting from erosion or faulting, often a transition zone between different physiogeographic provinces.

Executive Order – Order issued by the President by virtue of his authority vested by the Constitution or by an act of Congress. An executive order has the force of law

Familial - A characteristic which tends to run in families.

Farmland – Cropland, pastures, meadows, and planted woodland.

Fauna – Animal life, especially the animal characteristics of a region, period, or special environment.

Federal Register – A daily publication of the U.S. Government Printing Office that contains notices, announcements, regulations, and other official pronouncements of U.S. Government administrative agencies. Various printed announcements and findings related to specified environmental matters and transportation projects and activities appear in this publication.

Fertility (soil) – The quality of a soil that enables it to provide nutrients in adequate amounts and in proper balance for growth of specified plants when other growth factors are favorable.

Fecal Coliform - A group of bacteria normally presenting high numbers in the intestinal tract of humans and other warm blooded animals.

Fill Material – Deposited materials such as, rock, soil, asphalt, concrete, construction debris, etc., natural or man-made.

Finding Of No Significant Impact (FONSI) – A determination by a Federal agency briefly presenting the reasons why an action/project will not have a significant effect on the human environment and for which an Environmental Impact Statement (EIS) will not be prepared.

Flatwater - Lake water or slow moving river current with no rapids**.**

Flood – The temporary condition caused by the accumulation of runoff from any source, which exceeds the capacity of a natural or man-made drainage system and results in inundation of normally dry land areas.

Flood Control - Various activities and regulations that help reduce or prevent damages caused by flooding. Typical flood control activities include: structural flood control works (such as bank stabilization, levees, and drainage channels), acquisition of flood prone land, flood insurance programs and studies, river and basin management plans, public education programs, and flood warning and emergency preparedness activities.

Floodplain - The relatively flat area or lowlands adjoining a river, stream, ocean, lake, or other body of water that is susceptible to being inundated by floodwaters.

Flood Prone - Land susceptible to inundation by the probable maximum flood (PMF) event.

Flood Proofing - Any combination of structural or non-structural changes or adjustments incorporated in the design, construction, or alteration of individual buildings or properties that will reduce flood damages.

Flood Protection Level - The level or elevation of floodwaters to which a structure or its contents are protected from flooding.

Floodwall - A barrier of concrete, masonry block, or other impervious material designed to keep water away from a building.

Floodway - The channel of a river and the portion of the adjacent overbank floodplain that usually carry most of a flood. The floodway must be kept open so that floods can proceed downstream and not be obstructed or diverted onto other properties. The NFIP and local regulations prohibit construction in floodways that obstructs flood flows and increases flood heights.

Flora – Vegetation; plant life characteristic of a region, period, or special environment.

Footprint - The outline of an area within which activities are suspected or known to exist.

Forestland - Land that can support at least 10 percent native tree cover under natural conditions. Forestland may include areas of grassland, shrubland, wetland, or other land classes.

Fracture – A general term for any break in a rock, whether or not it causes displacement, caused by mechanical failure from stress. Fractures include cracks, joints, and faults. Fractures can act as pathways for rapid ground water movement.

Freeboard - The vertical distance between the normal maximum level of the water surface in a channel, reservoir, tank, canal, etc., and the top of the sides of a levee, dam, etc., which is provided so that waves and other movements of the liquid will not overtop the confining structure.

Free-Flowing – A condition in which a body of water is unmodified by the works of man or if modified still retains its natural scenic qualities and recreational opportunities.

Fugitive Dust – Particles that are light enough to be suspended in air and that are not caught in a capture or filtering system. For this document, this refers to particles put in the air by moving vehicles and air movement over disturbed soils at construction sites.

Fugitive Emissions - Air pollutants which are emitted directly to the atmosphere and not through a well-defined stack or vent.

Functional Classification – The process by which streets and highways are grouped into classes, or systems, according to the character of traffic service that they are intended to provide. There are three highway functional classifications: arterial, collector, and local roads. All streets and highways are grouped into one of these classes, depending on the character of the traffic (i.e., local or long distance) and the degree of land access that they allow. An arterial provides the highest level of service at the greatest speed for the longest uninterrupted distance, with some degree of access control. A collector provides a less highly developed level of service at a lower speed for shorter distances by collecting traffic from local roads and connecting them with arterials. “Local” includes all roads not defined as arterials or collectors; these roadways provide access to land with little or no through movement.

Gabion Baskets - Rectangular containers (usually made of heavy galvanized wire) that can be wired together, and then filled with stones to make quick retaining walls for erosion control.

Gate Valve - Type of valve that uses a sliding "gate" across the face of the valve to control flow.

Geographic Information System (GIS) - GIS is a computer system that allows environmental analysts to compile, analyze, and model information relevant to proposals that require environmental analysis. It is also a tool that assists decision making by providing a visual depiction of complex data, customized for the situation and circumstances associated with the decision.

Geologic – Of or related to a natural process acting as a dynamic physical force on the Earth (i.e., faulting, erosion, mountain building resulting in rock formations).

Geology – Science that deals with the earth's physical history, the rocks of which it is composed, and its physical changes.

Geologic Hazard - A naturally occurring or man-made geologic condition that presents a risk or is a potential danger to life and property.

Geology, Topography, and Soils – One of the resource areas analyzed in this EIS for each of the alternatives considered.

Geometries - Models of the curvature of the universe in which the laws of geometry are like those that would apply on flat, spherical, or saddle-shaped surfaces.

Geotechnical - Referring to the use of scientific methods and engineering principles to acquire, interpret, and apply knowledge of earth materials for solving engineering problems.

Geotextile Fabric - A man-made fabric used in the control of soil erosion.

Grading - Altering a land surface by cutting, filling and/or smoothing to meet a designated form and function.

Gravity Wall - A brick, stone, or concrete wall that is stable against sliding and rotation (overturning) on its foundation or on any horizontal plane by virtue of its shape and weight

Groundwater – Water contained in pores or fractures in either the unsaturated zone or saturated zone below ground level.

Guy Wires – Support wires that hold the mast up. They are usually necessary when the mast exceeds 12 feet in length. In most places, the mast will eventually face an 80 mph wind.

Habitable - A description of a dwelling or property that is appropriate for human occupancy.

Habitat – Area in which a plant or animal lives and reproduces.

Hardwoods - A description applied to woods from deciduous broad-leafed trees such as oak, maple, and ash.

Hazardous and Toxic Materials and Wastes – Hazardous material is defined as any material that, because of its quantity, concentration, physical or chemical properties, or infectious characteristics, might cause harm to human health or the environment (49 CFR Part 171). These characteristics are subcategorized as flammable, ignitable, corrosive, toxic, or oxidative. Hazardous waste is defined as any solid waste, or combinations of solid wastes, that because of their quantity, concentration, physical or chemical properties, or infectious characteristics, may cause or contribute to an increase in mortality or increase in serious irreversible or incapacitating reversible illness or pose a substantial present or potential hazard to human health or the environment when improperly stored, treated, transported, disposed of, or otherwise managed [RCRA Section 1004(5)].

Hazardous Material – A substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, and property when transported in commerce and that has been designated as hazardous under section 5103 of Federal hazardous materials transportation law (49 U.S.C. 5103). The term includes hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions in part 173 of subchapter C of CFR chapter I (USDOT 2003).

Hazardous Substance – Any substance that, due to its quantity, concentration, or physical and chemical characteristics, poses a potential hazard to human health and safety or to the environment.

Hazardous Waste – A solid waste (or combination of wastes) that, due to its quantity, concentration, or physical, chemical, or infectious characteristics, can cause or significantly contribute to an increase in mortality. RCRA further defines a hazardous waste as one that can increase serious, irreversible, or incapacitating reversible illness or pose a hazard to human health or the environment when improperly treated, stored, disposed of, or otherwise managed.

Hazardous Waste Storage – As defined in 40 CFR 260.10, "... the holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere" (AR 200-1).

Headwater – The source or point of origin of a stream or river.

Heavy Metals - Metallic or semi-metallic elements of high molecular weight, such as mercury, chromium, cadmium, lead, and arsenic, that are toxic to plants and animals at known concentrations.

Historic - The time after information was written down.

Historic Building or Structure – A building or structure, including Goodale's Cutoff, WWII canals, reactors, reactor control panels, WWII concussion walls, and shielded locomotive, that is eligible to the National Register of Historic Places (NHRP).

Household – A **household** includes all the persons who occupy a housing unit. A housing unit is a house, an apartment, a mobile home, a group of rooms, or a single room that is occupied (or if vacant, is intended for occupancy) as separate living quarters.

Human Environment - The natural and physical environment and the relationship of people with that environment.

Hydric Soil – A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic (oxygen-lacking) conditions that favor the growth and regeneration of hydrophytic vegetation.

Hydrocarbon – Any of a vast family of compounds containing hydrogen and carbon. Used loosely to include many organic compounds in various combinations; most fossil fuels are composed predominantly of hydrocarbons. When hydrocarbons mix with nitrogen oxides in the presence of sunlight, ozone is formed.

Hydroelectric - The creation of power through use of energy of falling water to turn an electric generator.

Hydrologic Soil Group - Four hydrologic soil groups are recognized by the NRCS and are provided in the Soil Survey for Lebanon County (USDA 1981). The groups reflect the permeability of the soil based on texture, clay mineralogy, impervious layers, water tables, and depth. Because the infiltration rate generally is inversely related to runoff and erosion, the hydrologic soil group is an indirect index to site erodibility. Groups A and B have moderate infiltration rates when thoroughly wetted. Group C has slow infiltration rates when thoroughly wetted. Group D has very slow infiltration rates when thoroughly wetted. As a general rule, soils in Group C are considered borderline while soils in Group D should be avoided for use as maneuver areas.

Ignitable - A solid, liquid or compressed gas waste that has a flash point of less than 140deg.F and is capable of burning or causing fire.

Impact – For an EIS, the positive or negative effect of an action (past, present, or future) on the natural environment (land use, air quality, water resources, geological resources, ecological resources, aesthetic resources, and scenic resources) and the human environment (infrastructure, economics, social, and cultural).

In Attainment – Areas that meet the National Ambient Air Quality Standards (NAAQS) for one or more of the criteria pollutants.

Incorporated Municipality – A city; An area in the United States with definite boundaries and legal powers set forth in a charter granted by the state.

Indirect Impact – An indirect impact is caused by an action and is later in time or farther removed in distance from the causal event, but still reasonably foreseeable. Indirect impacts may include induced changes in the pattern of land use, population density or growth rate, and related effects on air, water and other natural resources and social systems. Referencing the example of possible direct impacts described above, the clearing of trees for new development may have an indirect impact on wildlife in adjacent areas by displacing wildlife from disturbed areas to adjacent areas.

Industrial - Includes manufacturing, handling and storage facilities, and associated parking, circulation, loading and other outdoor work areas.

Infrastructure – Buildings, facilities, bases, transport systems and communications systems necessary to support military operations. These include surface and subsurface facilities (for example, service drifts, transporters, electric power supplies, waste handling buildings, administrative facilities).

In Situ - In its original place; unmoved unexcavated; remaining at the site or in the subsurface.

Institutional - Includes public buildings, such as schools and adjacent athletic fields.

Invisible Wall – a removable floodwall that is erected only when flood waters threaten. Once the flood recedes, the wall is disassembled and stored.

Karst - A limestone region characterized by underground drainage, sinkholes, rolling surfaces, and caverns.

Landform - Any physical feature of the earth's surface having a characteristic, recognizable shape and produced by natural causes such as, mountains, hills, plains, valleys, canyons, and plateaus.

Landscape - The traits, patterns, and structure of a specific geographic area, including its biological composition, its physical environment, and its anthropogenic or social patterns.

Land Resources - Natural resources in the form of land suitable for cultivation.

Land Tenure – The right to exclusively occupy and use a specified area of land.

Lateral bar – an earthen mound created by the river that is parallel to the river current and found in the lower energy portion of the river.

Levee - A mound of earth with an impermeable core that prevents water passage.

Level of Service – A measure of the quality and quantity of transportation service provided, including characteristics that are quantifiable and those that are difficult to quantify. For roadway systems, a qualitative rating of the effectiveness of a highway or highway facility in serving traffic, in terms of operating conditions. A rating of traffic flow ranging from A (excellent) through F (heavily congested) compares actual or projected traffic volume with the maximum capacity of the intersection or road in question.

Loam - Soil composed of sand, clay and organic matter

Low-Income Population – One in which 20 percent or more of the persons in the population live in poverty, as reported by the Bureau of the U.S. Census in accordance with Office of Management and Budget requirements.

Maintenance Area (air) - An area that had previously been designated a non-attainment area, but now meets applicable air quality standards.

Major Impact – An impact that would be particularly large in magnitude, considering both context and intensity.

Mammal - A warm-blooded animal with hair that breathes air, has internal fertilization and nurses its live-borne young.

Meanders - Looping changes of direction of a stream caused by the erosion and deposition of bank materials.

Mesic - Refers to a habitat that is well-drained but usually moist through most of the growing season.

Mesophytic Forest – Trees and plants that grow in an environment having a moderate amount of moisture.

Mineral - A naturally occurring, usually inorganic, solid consisting of either a single element or a compound, and having a definite chemical composition and a systematic internal arrangement of atoms.

Mineral Extraction – Crushing and separating ore into valuable substances or waste by any of a variety of techniques

Minor Impact – An impact that would be of a smaller scale or would be more readily mitigated than impacts categorized as major.

Minority Population – A community in which the percent of the population of a racial or ethnic minority is 10 points higher than the percent found in the population as a whole.

Mitigate – 1. To moderate (a quality or condition) in force or intensity; alleviate. 2. To become milder.

Mitigation – Actions and decisions that (1) avoid impacts altogether by not taking a certain action or parts of an action; (2) minimize impacts by limiting the degree or magnitude of an action; (3) rectify the impact by repairing, rehabilitating, or restoring the affected environment; (4) reduce or eliminate the impact over time by preservation and maintenance operations during the life of the action; or (5) compensate for an impact by replacing or providing substitute resources or environments.

Mobilization - Process of activating resources including personnel, equipment and supplies.

Mobile Sources - Vehicles, aircraft, watercraft, construction equipment, and other equipment that use internal combustion engines for energy sources.

Monitoring - The assessment of emissions and ambient air quality conditions. The following monitoring techniques are used emission estimates, visible emission readings, diffusion or dispersion estimates, sampling or measurement with analytical instruments.

Mud Flats - A wide flat, area of fine sediment deposited in bays or estuaries by rivers or tides.

National Ambient Air Quality Standards (NAAQS) – Nationwide standards set up by the USEPA for widespread air pollutants, as required by Section 109 of the CAA. Currently, six pollutants are regulated by primary and secondary NAAQS: carbon monoxide (CO), lead, (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM-10), and sulfur dioxide (SO_2).

National Environmental Policy Act (NEPA) (of 1969) – The nation's basic charter for protecting the environment. It establishes policy, sets goals, and provides means for carrying out the policy. In accordance with NEPA, all Federal agencies must prepare a written statement on the environmental impact of a proposed action. NEPA requires all Federal agencies to consider the potential effects of proposed actions on the human and natural environment (AR 200-1). The provisions to ensure that Federal agencies act according to the letter and spirit of NEPA are the Council on Environmental Quality regulations for implementing NEPA (43 CFR 1500-1508).

National Historic Preservation Act (of 1966) – The nation's central historic preservation law. It establishes the legal and administrative context within which local historic preservation commissions relate to, and participate in, the national historic preservation program. Passed at a time when Americans were becoming increasingly aware of modern development's damaging effects on their heritage, , and strengthened and elaborated upon several times since, the Act is designed to encourage preservation and wise use of our historic resources.

Native American – A member of any of the indigenous peoples of the Western Hemisphere. The ancestors of the Native Americans are generally considered by scientists to have entered the Americas from Asia by way of the Bering Strait sometime during the late glacial epoch.

Natural Environment – The environment, consisting of all living and nonliving things, that is not the result of human activity or intervention.

Navigable Waters - Waters of the US including territorial seas; any waters susceptible to commerce or subject to tidal activity; interstate waters including wetlands; all other waters, lakes, or streams and their tributaries; whose use or degradation could affect commerce or use.

Nitrogen Oxides – Gases formed in great part from atmospheric nitrogen and oxygen when combustion occurs under conditions of high temperature and high pressure; a major air pollutant. Two primary nitrogen oxides, nitric oxide (NO) and nitrogen dioxide (NO_2), are important airborne contaminants. Nitric oxide combines with atmospheric oxygen to produce nitrogen dioxide. Both nitric oxide and nitrogen dioxide can, in high concentration, cause lung cancer. Nitrogen dioxide is a criteria pollutant.

No-Action Alternative – Provides a baseline to compare impacts associated with the other alternatives. In reference to this EIS, the 56th Brigade would not implement the actions necessary to support transformation into an SBCT unit and would not be responsive to the Secretary of the Army's directive to be one of six brigades that would constitute the Interim Capability Phase. The 56th Brigade would retain its current mission, unit structure, and training approach using existing facilities.

Noise – Any sound that is undesirable because it interferes with speech and hearing. If intense enough, it can damage hearing.

Non-attainment Areas – Geographic areas in which the level of a criteria air pollutant is higher than the level allowed by the Federal standards. A single geographic area may have acceptable levels of one criterion air pollutant but unacceptable levels of one or more other criteria air pollutants; therefore, an area can be simultaneously attainment and non-attainment.

Nonresidential – Refers to structures and commercial areas not used as dwellings by people, which includes wholesale and retail sales, restaurants, manufacturing, transport, government, schools, and institutions.

Occupational Safety and Health Administration (OSHA) – OSHA's mission is to assure the safety and health of America's workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in workplace safety and health.

Ordinary High Water Mark – The mark of where vegetation stops on a streambank. Below this mark, the streambank is inundated often enough to limit vegetation growth. Above this mark, vegetation growth is not inhibited by inundation.

Organic - Designating or composed of matter originating in plant or animal life or composed of chemicals or hydrocarbon origin.

Outmigration - To leave one region or community in order to settle in another especially as part of a large-scale and continuing movement of population.

Overtopping – The flow of water over the top of a dam or embankment.

Oxidation Ditch - shaped ditch, usually oval, with a revolving drum-like aerator which circulates the liquid within it and supplies air to it, to reduce the organic material by aerobic action.

Ozone (O_3) – The triatomic form of oxygen; in the stratosphere, ozone protects the Earth from the Sun's ultraviolet radiation, but in lower levels of the atmosphere it is an air pollutant.

Paleontological – Of, or pertaining to, paleontology, which is the study of the forms of life existing in prehistoric or geologic times, as represented by the fossils of plants, animals, and other organisms.

Parcel – A plot of land, usually a division of a larger area.

Particulates – Fine liquid or solid particles, such as dust, smoke, mist, fumes, or smog, found in air or emissions.

Particulate Matter (PM_{10}) – Particulate matter is a criteria air pollutant and is a finely divided particle with an aerodynamic diameter of 10 micrometers or less. Particulate matter includes dust, soot, and other tiny bits of solid materials that are released into and move around in the air. Particulates are produced by many sources, including burning of diesel fuels by trucks and buses, incineration of garbage, mixing and application of fertilizers and pesticides, road construction, industrial processes (e.g., steel making), mining operations, agricultural burning (e.g., field and slash burning), and operation of fireplaces and wood stoves. Particulate pollution can cause eye, nose, and throat irritation, as well as other health problems.

Pathogen – An organism capable of producing disease.

Peak Flow – The maximum rate of flow through a watercourse for a given storm.

Petroleum - A generic term applied to oil and oil products in all forms, such as crude oil, lease condensate, unfinished oils, petroleum products, natural gas plant liquids, and non-hydrocarbon compounds blended into finished petroleum products.

Physical Environment – The complex of inanimate elements that surround an organism.

Physiographic regions - a geographic designation or division based on an area's topography, soil, moisture levels, and drainage that differs significantly from that of adjacent regions.

Planetarium – A domed theater in which a special device in the center of the room projects a simulation of the nighttime sky onto a dome above the audience.

Plant Community - A vegetative complex unique in its combination of plants which occurs in particular locations under particular conditions.

Plasticity Index - The Plasticity Index (often abbreviated as PI) is a numerical measure of the plasticity of a soil. It corresponds to the range of moisture contents, expressed as percent water by dry weight of soil, within which the soil has plastic properties.

Plateau - an area of highland, usually consisting of relatively flat open country uplifted by tectonic activity.

Pollutant - A substance introduced into the environment that adversely affects the usefulness of a resource.

Pollution - The condition caused by the presence in the environment of substances of such character and is such quantities, that the quality of the environment is impaired or rendered offensive to life.

Pool Complexes – Deeper, slow moving sections of a stream associated with rifles, faster, more shallow areas of the stream.

Potable Water - Water which is suitable for drinking.

Ponding - The process, occurring after a rainfall, when water gathers in low lying areas throughout a watershed and never makes it to a bayou or creek.

Prehistoric - The period of time before written records.

Proposed Action – A plan that a Federal agency intends to implement and that is the subject of an environmental analysis. Usually the Proposed Action is the agency's preferred alternative for a project. The Proposed Action and all reasonable alternatives are evaluated against the No-Action Alternative. A proposed action includes the project and its related support activities (preconstruction, construction, and operation, along with post operational requirements).

Pretreatment - Processes used to reduce, eliminate, or alter the nature of wastewater pollutants from non- domestic sources before they are discharged into publicly owned treatment works (POTW).

Prevailing Winds - Surface winds that generally flow in the same direction for long time periods for a particular region and time of year.

Prime Farmland – A special category of highly productive cropland that is recognized and described by the US Department of Agriculture's Soil Conservation Service and receives special protection under the Surface Mining Law.

Raceway – A fish rearing unit that has a continuous flow of fresh water to maintain suitable oxygen, temperature, and cleanliness.

Radon - A colorless naturally occurring radioactive, inert gas formed by radioactive decay of radium atoms in soil or rocks.

Ravine - A long, deep hollow in the earth eroded by a stream.

Reach – An expanse: a reach of prairie; a stream reach.

Reactive - Unstable and readily undergoes violent change, reacts violently with water, can produce toxic gases with water, or possess other similar properties.

Reclamation – The process of reconverting disturbed lands to their former or other productive use.

Recreational – Includes parks, playgrounds, trails, and other recreational land uses.

Relief – The elements of topography that give height and depth to the surface of the earth.

Remediation - A long-term action that reduces or eliminates a threat to the environment.

Reptile - Any of a class of vertebrates that regulates its body temperature externally, has dry, glandless skin covered with scales, breathes through lungs and lays large eggs that develop on land.

Reservoir - Any natural or artificial holding area used to store, regulate, or control water.

Residential – Refers to structures which are used as dwellings by people including, single family housing, multiple family housing, (apartments, duplexes (or similar configurations), condominiums) or mobile homes

Resource Conservation and Recovery Act (RCRA) – A Federal waste management law. Its regulations govern the management (transportation, treatment, storage, and disposal) of solid waste and the generation, accumulation, recycling, and handling of hazardous waste. RCRA waste includes material listed on one of the U.S. Environmental Protection Agency's hazardous waste lists or material that meets one or more of the U.S. Environmental Protection Agency's four characteristics: ignitability, corrosivity, reactivity, or toxicity.

Riffle – The fast flowing sections of a stream where shallow water races over stones and gravel.

Ringwall – A floodwall that protects a single structure and consists of a wall and a gate.

Riparian Corridors – Areas adjacent to rivers and streams that have a high density, diversity, and productivity of plant and animal species relative to nearby uplands.

River Mile - A system of mileage markers measured along the center line of major rivers used for inland navigation within the United States.

Riverine - Located on or inhabiting the banks or the area near a river or lake.

Runoff – The portion of the precipitation on a drainage area that is discharged from the area in stream channels.

Rural - Sparsely settled places away from the influence of large cities and towns.

Sand – A sedimentary material, finer than a granule and coarser than silt, with grains between 0.06 and 2.0 millimeters in diameter.

Sandstone - A sedimentary rock consisting of quartz sand united by some cementing material, such as iron oxide or calcium carbonate.

Sediment – Solid materials, both mineral and organic, in suspension or transported by water, gravity, ice, or air; may be moved and deposited away from their original position and eventually will settle to the bottom.

Sedimentation - The process of subsidence and deposition of suspended matter from a wastewater by gravity.

Sedimentary Rock – Rock formed by the lithification of mechanical, chemical, or organic sediments.

Seep - A spot where water contained in the ground moves slowly to the surface and often forms a pool.

Seepage – The slow gravitational movement of water through the soil.

Seismic – Pertaining to, characteristic of, or produced by earthquakes or earth vibrations.

Seismic Activity - Vibrations in Earth produced by earthquakes.

Seismic Hazard – The hazards expected from earthquake ground motions at any point on the earth.

Sensitive Receptors – They include, but are not limited to, asthmatics, children, and the elderly, as well as specific facilities, such as long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, playgrounds, and childcare centers.

Setting – The context and environment in which a situation is set; the background

Shale - A fine-grained sedimentary rock formed from mud and silt, commonly gray to black that tends to split into thin layers.

Shrink-Swell Potential - The potential of a material, such as a soil, to swell upon absorption of water or to shrink upon drying.

Significant Impact - According to 40 CFR 1508.27, "Significantly" as used in NEPA requires consideration of both context and intensity.

a. Context. The significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

b. Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action.

Silt – A sedimentary material consisting of very fine particles intermediate in size between sand and clay.

Silt Fence - A fence constructed of wood or steel supports and either natural (e.g. burlap) or synthetic fabric stretched across area of non-concentrated flow during site development to trap and retain on-site sediment due to rainfall runoff.

Siltstone - A fine-grained, layered sedimentary rock composed primarily of grains between 1/256 mm and 1/16 mm in size.

Siltation - the deposition of finely divided soil and rock particles upon the bottom of stream and river beds and reservoirs.

Slope – A measurement of the steepness of terrain, the ratio of vertical rise to horizontal distance expressed as a percentage or as degrees of angle

Socio-economics - The social and economic impacts of any product or service offering, market intervention or other activity on an economy as a whole and on the companies, organization and individuals who are its main economic actors.

Soil – The mixture of altered mineral and organic material at the earth's surface that supports plant life.

Solid Waste - Unwanted or discarded solid, liquid, semisolid or contained gaseous material, including, but not limited to: demolition debris;

material burned or otherwise processed at a resources recovery facility or incinerator; material processed at a recycling facility; and sludges or other residue from a water pollution abatement facility, water supply treatment plant or air pollution control facility. Also, Any discarded material that is not excluded by section 261.4(a) or that is not excluded by variance granted under sections 260.30 and 260.3 1 (40 CFR 261.2).

Special Waste - broad category of waste not suitable for traditional disposal processes such as, household hazardous waste, bulky wastes (refrigerators, pieces of furniture, etc.), tires, and used oil.

Stakeholder – A person, jurisdiction, organization, or agency with an interest in a particular project.

Standard Project Flood (SPF) – The discharge expected to result from the most severe combination of meteorological and hydrological conditions that are reasonably characteristic of the geographic region involved.

State Historic Preservation Officer (SHPO) – An individual responsible for the operation and management of the Office of Historic Preservation, as well as for long range preservation planning. The Governor appoints the SHPO in consultation with the State Historical Resources Commission and the Director of the Department of Parks and Recreation. The SHPO assists the Commission in accomplishing its goals and duties by developing and administering a program of public information, education, training, and technical assistance. The SHPO also serves as Executive Secretary to the Commission and is responsible for developing an administrative framework for the Commission, as well as for implementing the Commission's preservation programs and priorities.

Stilling Basin - A basin constructed to dissipate the energy of fast-flowing water (e.g., from a spillway or bottom outlet), and to protect the streambed from erosion.

Storm Water – The water/rainwater that runs off surfaces such as rooftops, paved streets, highways, and parking lots and enters the storm drain system, emptying into lakes, rivers, streams, or the ocean. It can also come from hard grassy surfaces like lawns, play fields, and from graveled roads and parking lots.

Stream - Small flowing bodies of fresh water that empty into rivers.

Stream Gage - A station established to measure flow in a river or stream either by sight or recording machine.

Strip-Mining – A process in which rock and topsoil strata overlying ore or fuel deposits are scraped away by mechanical shovels.

Subregion - The first order sub-unit of a bioregion, which is a conceptual unit which derives from a larger region or continent and is usually based on location.

Subsurface – A zone below the surface of the Earth, the geologic features of which are principally layers of rock that have been tilted or faulted and are interpreted on the basis of drill hole records and geophysical (seismic or rock vibration) evidence. In general, it is all rock and solid materials lying beneath the Earth's surface.

Succession – The progressive development of vegetation toward its highest ecological expression.

Sulfur Dioxide – A pungent, colorless gas produced during the burning of sulfur-containing fossil fuels. It is the main pollutant involved in the formation of acid rain. Coal- and oil-burning electric utilities are the major source of sulfur dioxide in the United States. Inhaled sulfur dioxide can damage the human respiratory tract and can severely damage vegetation. See *Criteria Pollutants*, *Ambient Air Quality Standards*.

Sulfur Oxides – A mixture of sulfur dioxide, sulfur trioxide, and inorganic sulfites and sulfates. Sulfur dioxide combines with oxygen in the air to form sulfur trioxide and microscopic aerosol sulfite and sulfate particles, all of which are lung irritants. See *Criteria Pollutants*, *Ambient Air Quality Standards*.

Superiority - the state of excelling or surpassing or going beyond usual limits.

Terrace – A level plain, usually with a steep front, bordering a river, a lake, or sometimes the sea. A level, narrow stretch of land interrupting a declivity. Also referred to as a bench.

Terrain - A particular geographic area; a region.

Terrestrial - Pertaining to, of living habitually on, the land or ground surface.

Test Pit – A small exploratory "dig" designed to determine a site's depth, and contents prior to major excavation.

Threatened Species – Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range, and that the appropriate Secretary has designated as a threatened species.

Topography – Physical features of the ground surface, such as hills, plains, mountains, steepness of slope, and other features.

Timbering - The setting of timber supports in mine workings or shafts for protection against falls from roof, face, or rib.

Topography - The shapes, patterns and physical configuration of the surface of the land, including its relief and the positions of natural and man-made features.

Toxic - Poisonous, carcinogenic, or otherwise directly harmful to life.

Toxic Substance – A harmful substance that includes elements, compounds, mixtures, and materials of complex composition.

Toxic Substances Control Act (of 1976) – The Toxic Substances Control Act (TSCA) was enacted to provide information about all chemicals and to control the production of new chemicals that might present an unreasonable risk of injury to health or to the environment. TSCA authorizes EPA to require testing of old and new chemical substances. TSCA also provides authority to regulate the manufacturing, processing, import, and use of chemicals. Because TSCA gives EPA broad powers, the law covers virtually all manufactured and natural chemicals.

Transportation – Includes roadway, interstates, rail lines, airports and other transportation corridors.

Tributaries - A secondary or branch of a stream, drain, or other channel that contributes flow to the primary or main channel.

Understory - The layer formed by the leaves and branches of the smaller trees under the forest canopy.

Unique Farmland – Land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, fruits, and vegetables.

Upland – The land that is at a higher elevation than the alluvial plain or stream terrace.

Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 USC §4601 et seq.) The Uniform Relocation Assistance and Real Property Acquisition Policies Act established guidelines to provide compensation for owners of property and houses affected by Federal projects. Owners of property and houses that must be acquired and removed to construct the project would be compensated according to the guidelines established by this Act.

Urban Area – An area comprising all territory, population, and housing units in urbanized areas, or places of 2,500 or more persons outside of urbanized areas. An urbanized area comprises one or more places (central place) and the adjacent densely settled surrounding territory (urban fringe) that together have a minimum of 50,000 persons.

Urban Runoff – The stormwater from city streets and gutters that usually contains a great deal of litter and organic and bacterial wastes.

Utilities – Includes power plants, transmission corridors, pipelines, substations and other utility-related land use.

Vegetated Shallows - Areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

Velocity – an object's speed and direction of motion; speed: distance traveled per unit time.

Veneer Wall – A wall covering of one type of construction covered by a second material to add strength.

Viewshed - A physiographic area composed of land, water, biotic, and cultural elements which may be viewed and mapped from one or more viewpoints and which has inherent scenic qualities and/or aesthetic values as determined by those who view it.

Visual Resources – Visual resources are defined as the natural and man-made features that comprise the aesthetic qualities of an area. Also, see *Aesthetics*.

Water Quality – The chemical, physical, and biological condition of water related to beneficial use.

Water Resources – The supply of groundwater and surface water in a given area.

Watershed - The land area that drains towards a natural surface water system (more precisely, a given point on such a system).

Wastewater – The water that carries wastes from homes, businesses, and industries consisting of a mixture of water and dissolved or suspended solids.

Well – A deep hole or shaft dug or drilled to obtain water or oil or gas or brine

Wetlands – Areas that are regularly saturated by surface or groundwater and are therefore characterized by a prevalence of vegetation that is adapted for life in saturated soil conditions. Examples include swamps, bogs, fens, marshes, and estuaries.

Wild and Scenic Rivers Act (of 1968) – The purpose of the Wild and Scenic Rivers Act (WSRA) is to preserve the free-flowing state of rivers that are listed in the National Wild and Scenic Rivers System or under study for inclusion in the System because of their outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. Rivers in the System are classified as wild river areas, scenic river areas, or recreational river areas. The WSRA establishes requirements applicable to water resource projects and protects both the river, or river segments, and the land immediately surrounding them.

Wildlife – Undomesticated animals considered collectively.

Wildlife Habitat - The set of living communities in which a wildlife population lives.

Zoning – Regulations that control the use of land within a jurisdiction.

CHAPTER 11. INDEX

Aesthetics 4-32, 4-38, 5-5, 5-34, 6-1, 6-8:12, 7-2

Agriculture 5-3, 5-6, 5-20, 5-44. 5-60

Air Quality 2-8, 2-12:13, 4-29, 4-38, 5-11:14, 6-4, 6-17:20, 6-65

Aquatic Resources 4-30, 4-39, 5-18:27, 6-26:37

Asbestos 4-38, 6-18, 6-20, 6-66:67

Big Sandy Community and Technical College 2-12, 4-9, 4-13, 4-15, 4-18:19, 4-22:23, 4-25:26, 4-28, 4-32, 4-34:36, 5-23:24, 5-59, 5-63, 5-66, 5-70, 5-74, 6-6:7

Biological Resources, *see Ecological Resources*

Community Cohesion, *see Socioeconomics*

Cultural Resources 4-31, 4-39, 5-34:52, 6-54:57

Cumulative Impacts 1-6, 3-2, 6-1, 6-72:73

Ecological Resources 4-30:31, 4-39, 5-28:31, 6-37:57

Education 4-32, 5-59, 6-57:65

Employment 4-32, 5-60, 6-57:65

Endangered Species 4-31, 5-31:33, 6-40, 6-48:49, 6-54

Environmental Justice 4-32, 6-65

Erosion 5-7:10, 6-12:16

Floodplain 5-20:24, 6-26:37

Haysi Dam 1-8, 1-10, 4-11

Housing 5-57, 6-57:66

Hazardous materials and hazardous waste 4-32, 4-40, 5-61, 6-66:67

Health and Safety 4-33, 4-40, 5-69, 6-68

Infrastructure 4-33, 4-40, 5-70:76, 6-68:72

Jenny Wiley State Resort Park 5-22, 5-48:49, 5-66, 5-76

Kentucky Transportation Cabinet 5-73:75, 5-77

Land Use 4-29, 4-38, 5:2:4, 6-3:8

Mitigation 4-38, 6-50:54

National Environmental Policy Act 1-6, 2-7, 3-1

Noise 4-29, 4-38, 5-14:17, 6-20:25

Notice of Intent 2-4

Parks 4-6, 4-12, 5-2:3, 5-4, 5-6, 5-17:18, 5-22, 5-54, 5-65:66, 5-76, 6-60:61

Prestonsburg High School 2-5, 2012, 4-8:9, 4-13, 4-16:20, 4-32, 4-33, 4-34, 4-38, 5-17, 5-24, 5-59, 5-66, 5-74, 6-6, 6-10, 6-19, 6-24:25, 6-60:62, 6-65, 7-1

Public Involvement 2-4:6, 7-1:7

Preferred Alternative 4-26:42

Recreation 4-32, 5-65

Terrestrial Habitats 4-30, 5-29, 6-39:40, 6-43, 6-49, 6-51

Schools 2-1, 4-8:9, 4-13, 4-29, 5-2, 5-59, 6-21, 6-57, 6-58, 6-60, 6-61:62, 6-63, 6-74, 6-75, *see also Prestonsburg High School*

Transportation 4-33, 5-73:76, 6-68:72

Scenic Resources, *see Aesthetics*

Socioeconomics 4-32, 5-56:63, 6-57:65

Soils 4-29, 4-38, 5-7, 6-12:16

United States Fish and Wildlife Service 2-5, 2-9:10, 4-39, 5-27, 5-31, 6-38:39, 6-54, 7-5

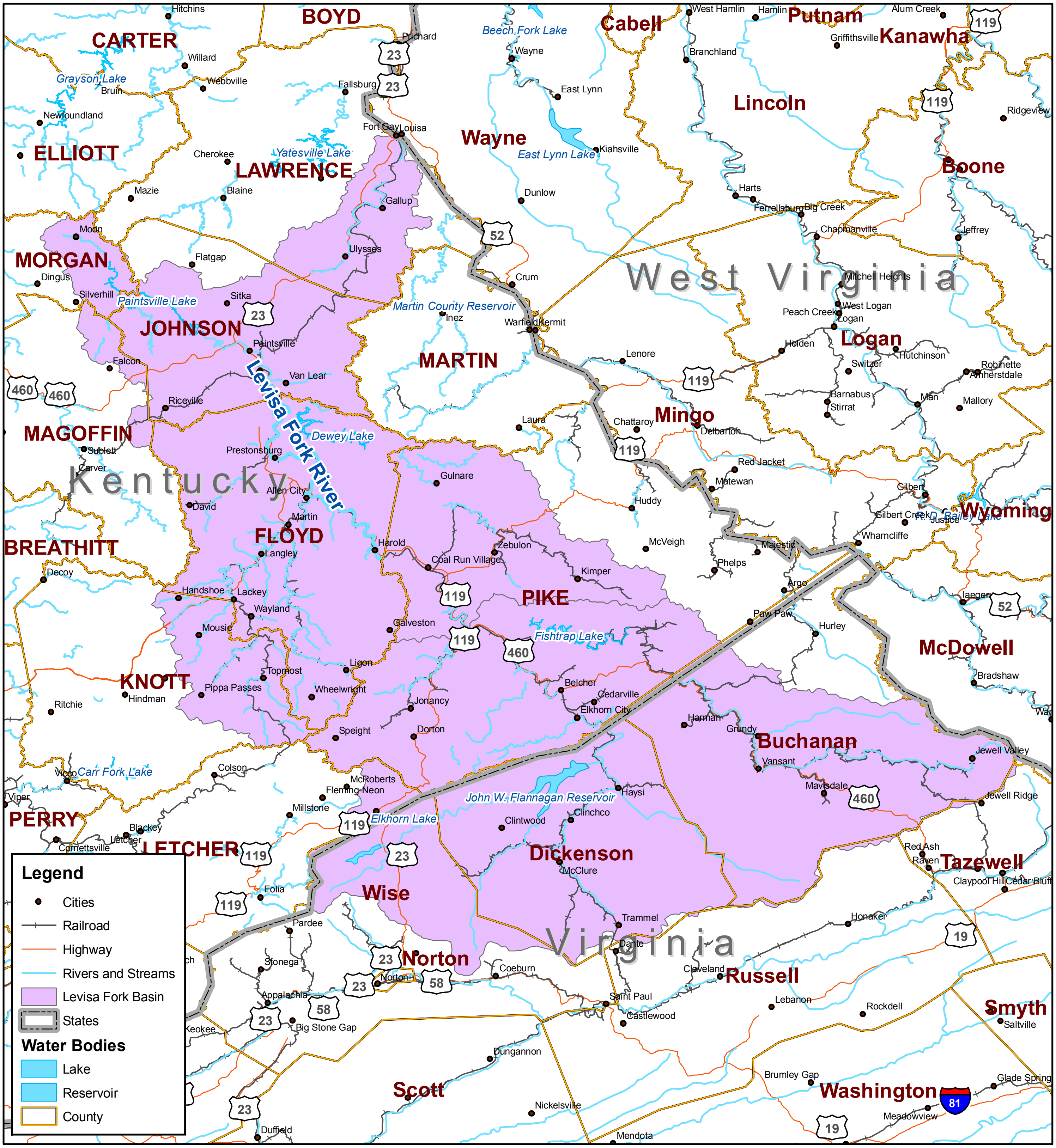
Utilities, *see Infrastructure*

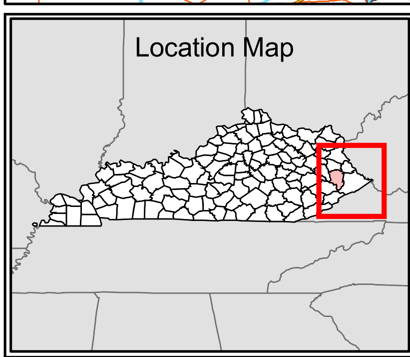
Water Resources 4-30, 4-39, 5-18:27, 6-26:37

Wetlands 4-31, 5-26, 6-40, 6-48, 6-49, 6-54

Wildlife, *see Terrestrial Resources*

Zoning 5-4





Levisa Fork Basin

Floyd County, KY

Notes

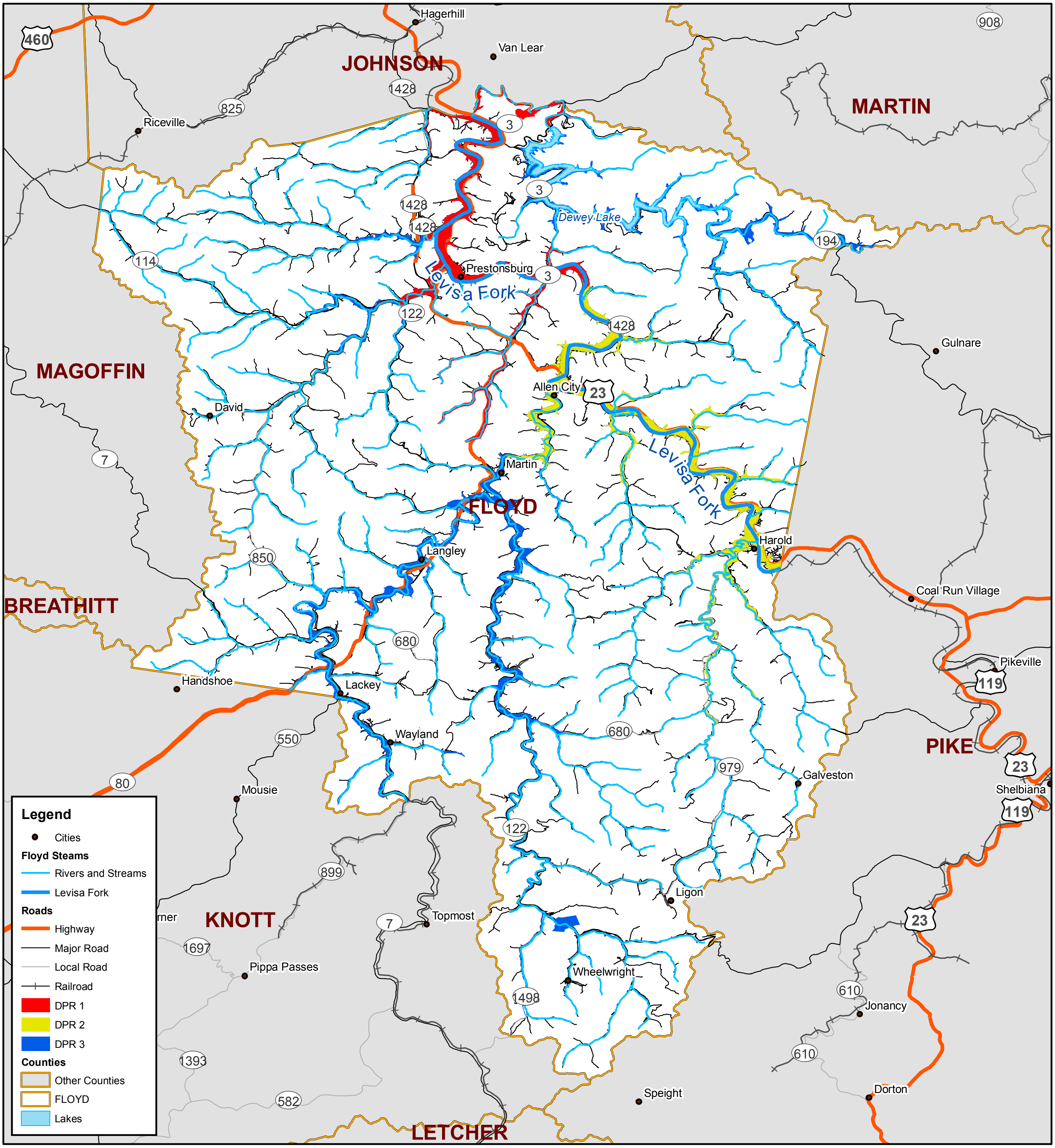
Figure

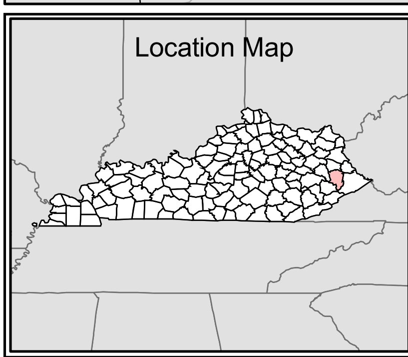
1-1

Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\Fig1-1_LevisaBasin.mxd Mar.10, 2006 DNB

0 3 6 12 18 Miles





Site Location Map

Floyd County, KY

Notes

Figure

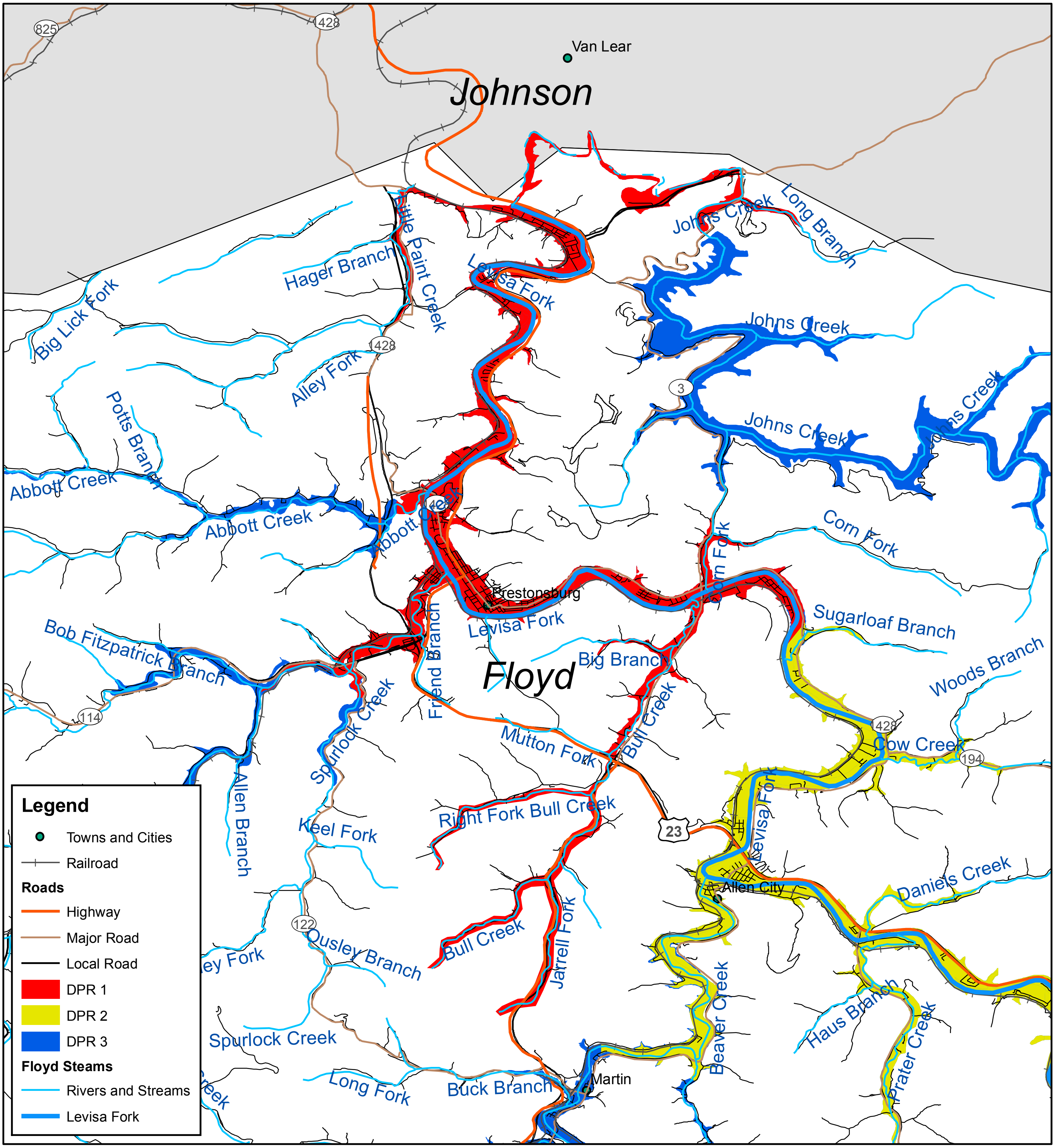
1-2

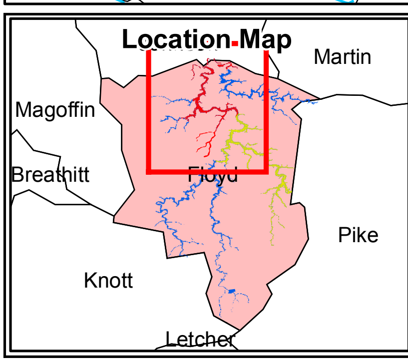
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\Mar06\Fig1-2_Siteloc.mxd Mar 10, 2006 DNB

amec

0 1 2 4 6 Miles





DPR 1

Floyd County, KY

Notes

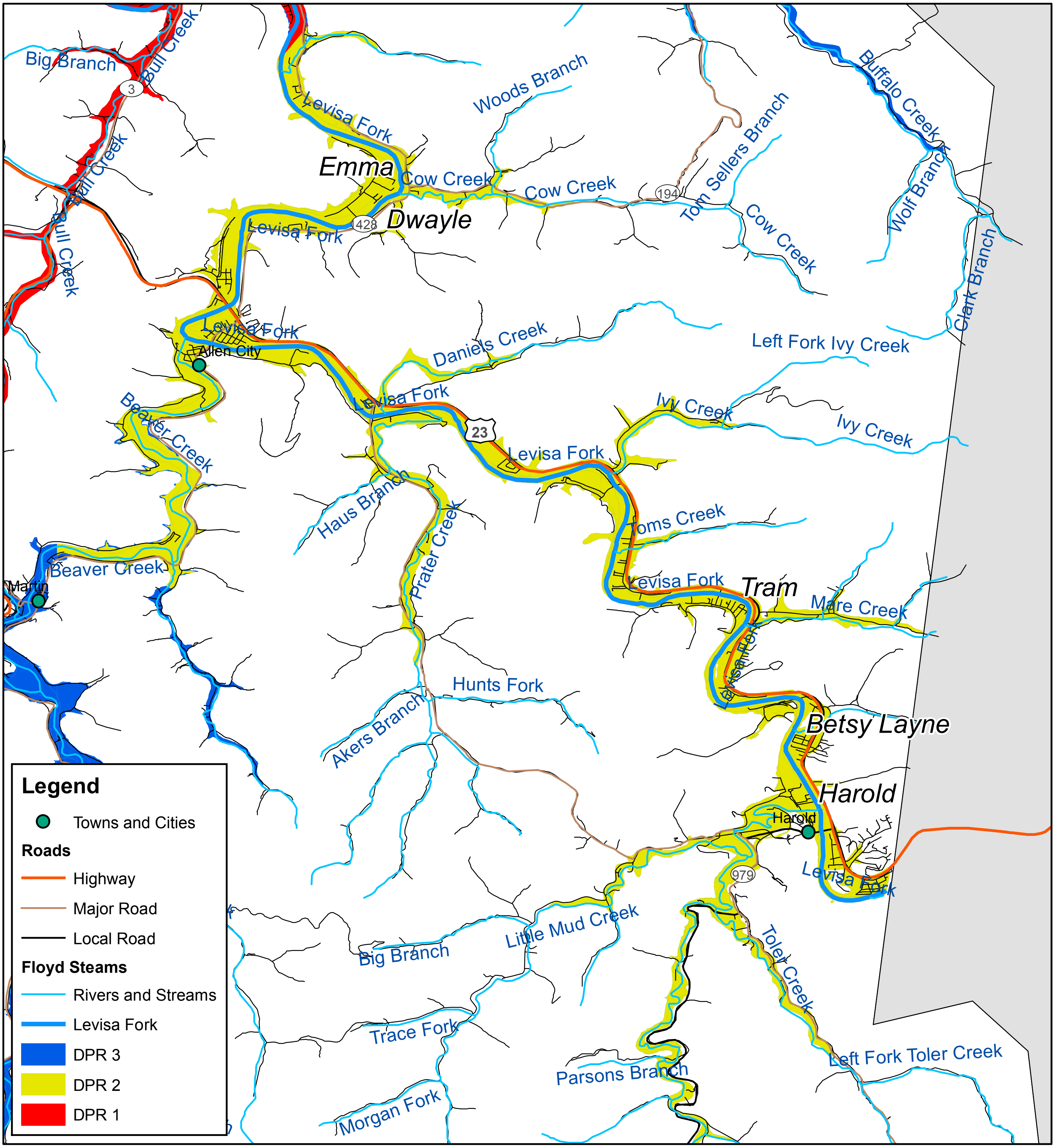
Figure

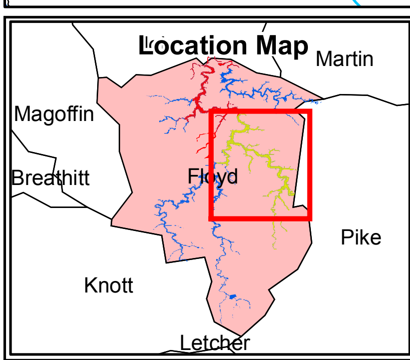
1-3

Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\Mar06\Fig1-3DPR1.mxd Mar 10, 2006 DNB

0 0.8 1.6 2.4 Miles





DPR 2

Floyd County, KY

Notes

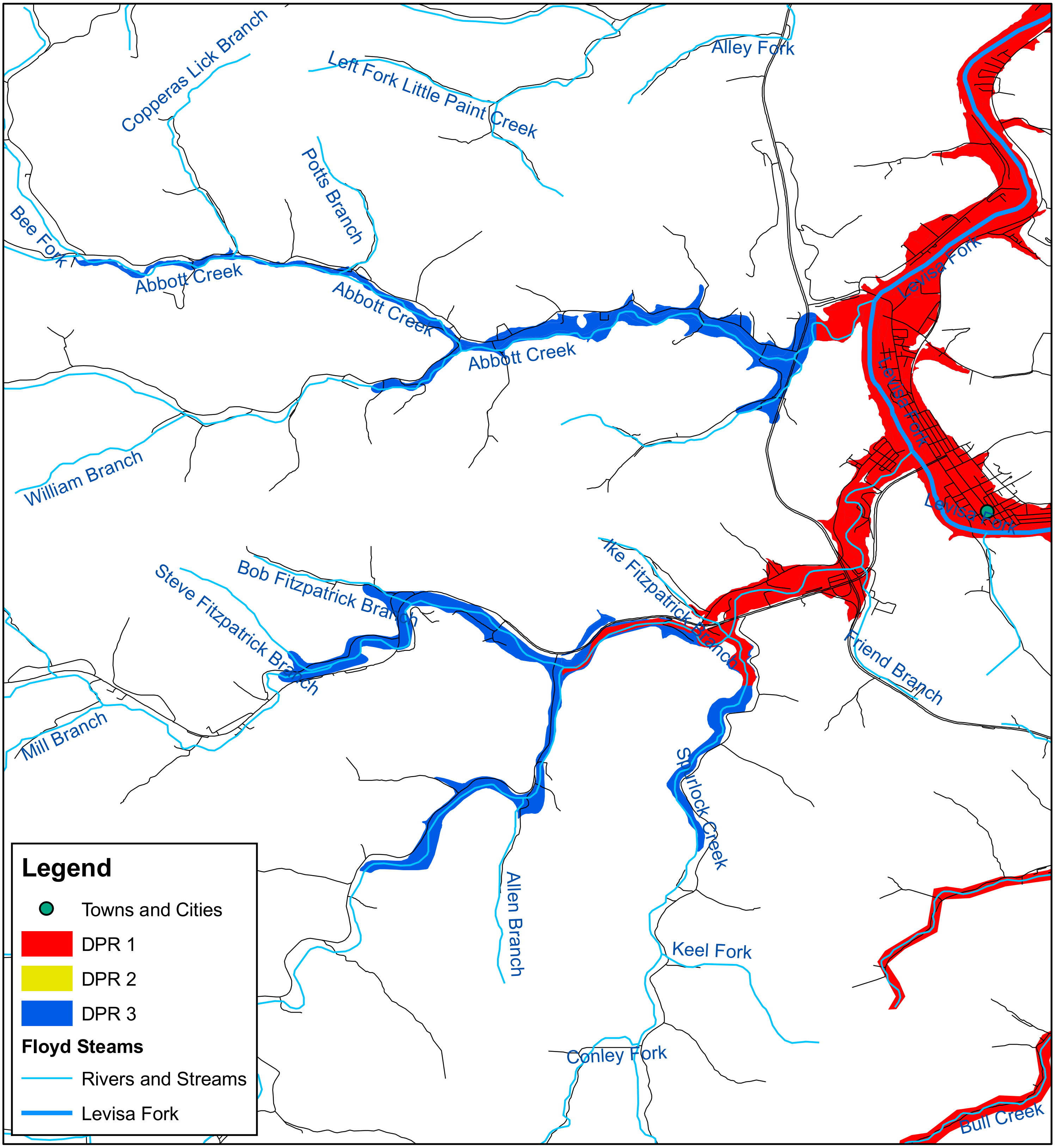
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

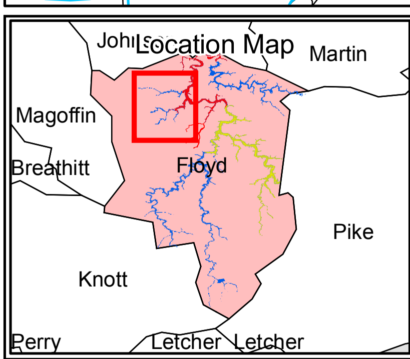
W:\USACE\Floyd-EIS\MXD\Fig1-4DPR2.mxd Mar 10, 2006 DNB

Figure
1-4

amec

0 0.5 1 1.5 2 Miles





DPR 3-1 (1 of 3)

Floyd County, KY

Notes

Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

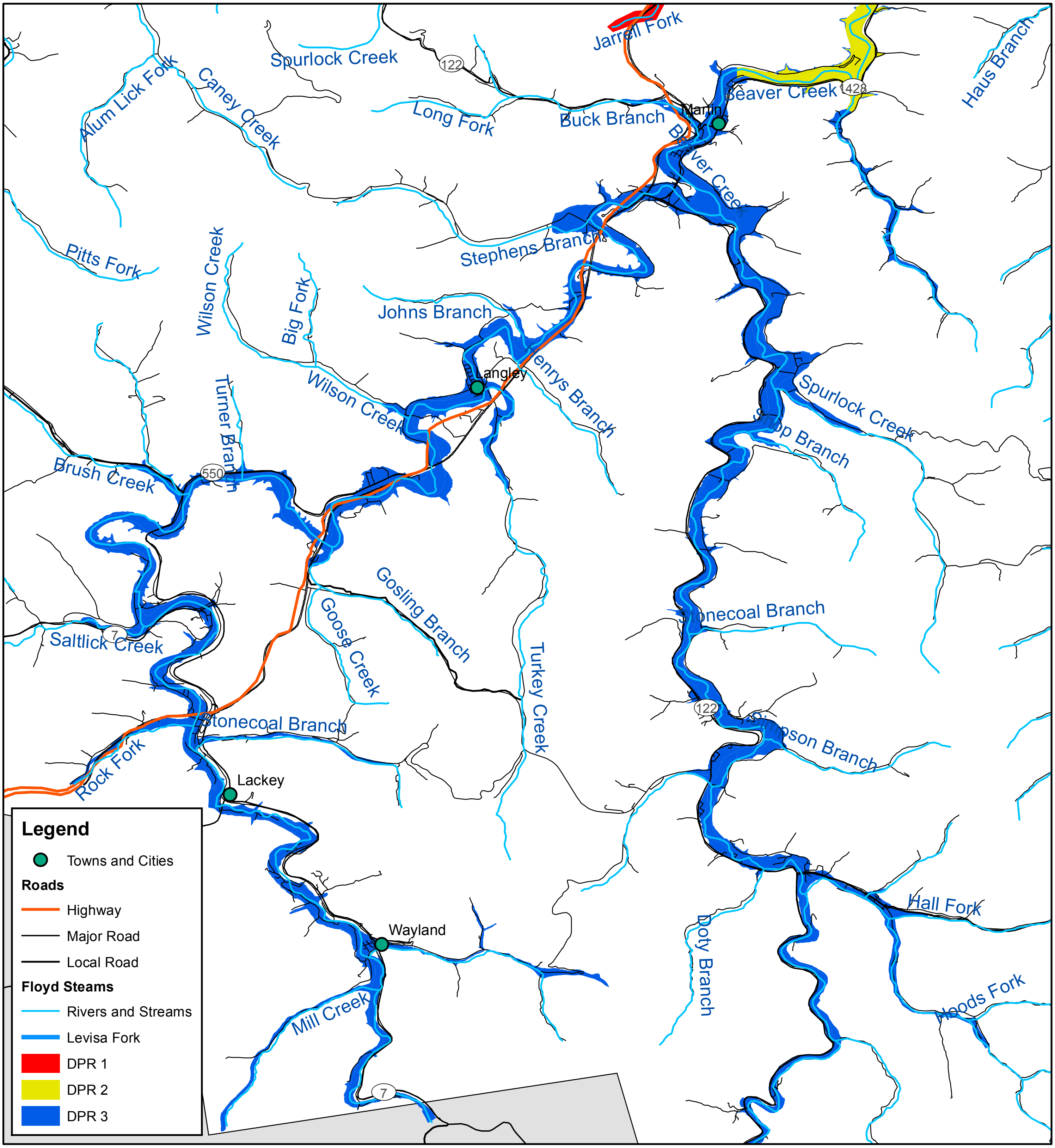
W:\USACE\Floyd-EIS\MXD\Fig1-5A_DPR3-1.mxd Mar 10, 2006 DNB

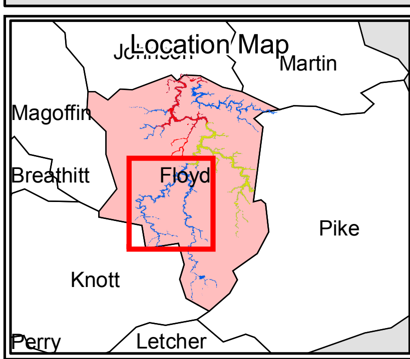
Figure

1-5A

amec

0 0.4 0.8 1.2 Miles





DPR 3-2 (2 of 3)

Floyd County, KY

Notes

Figure

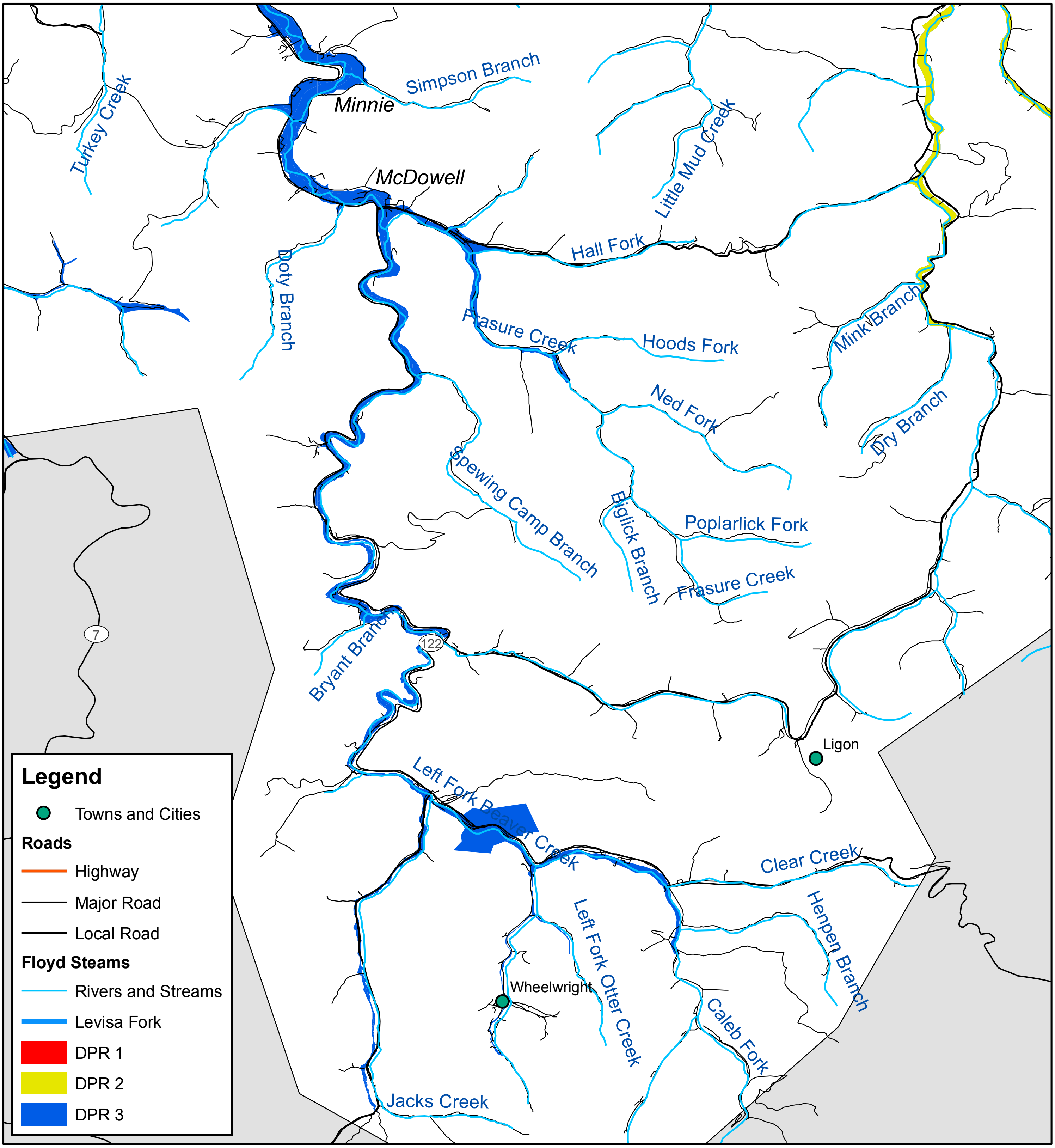
1-5B

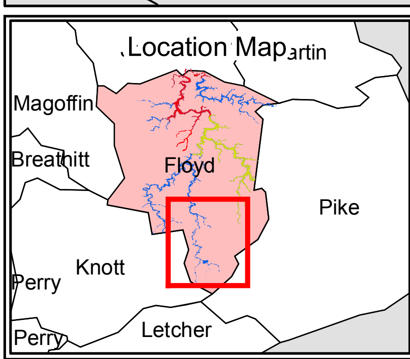
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\Fig1-5B_DPR3-2.mxd   Mar 10, 2006   DNB

amec

0 0.5 1 1.5 2
Miles





DPR 3-3 (3 of 3)

Floyd County, KY

Notes

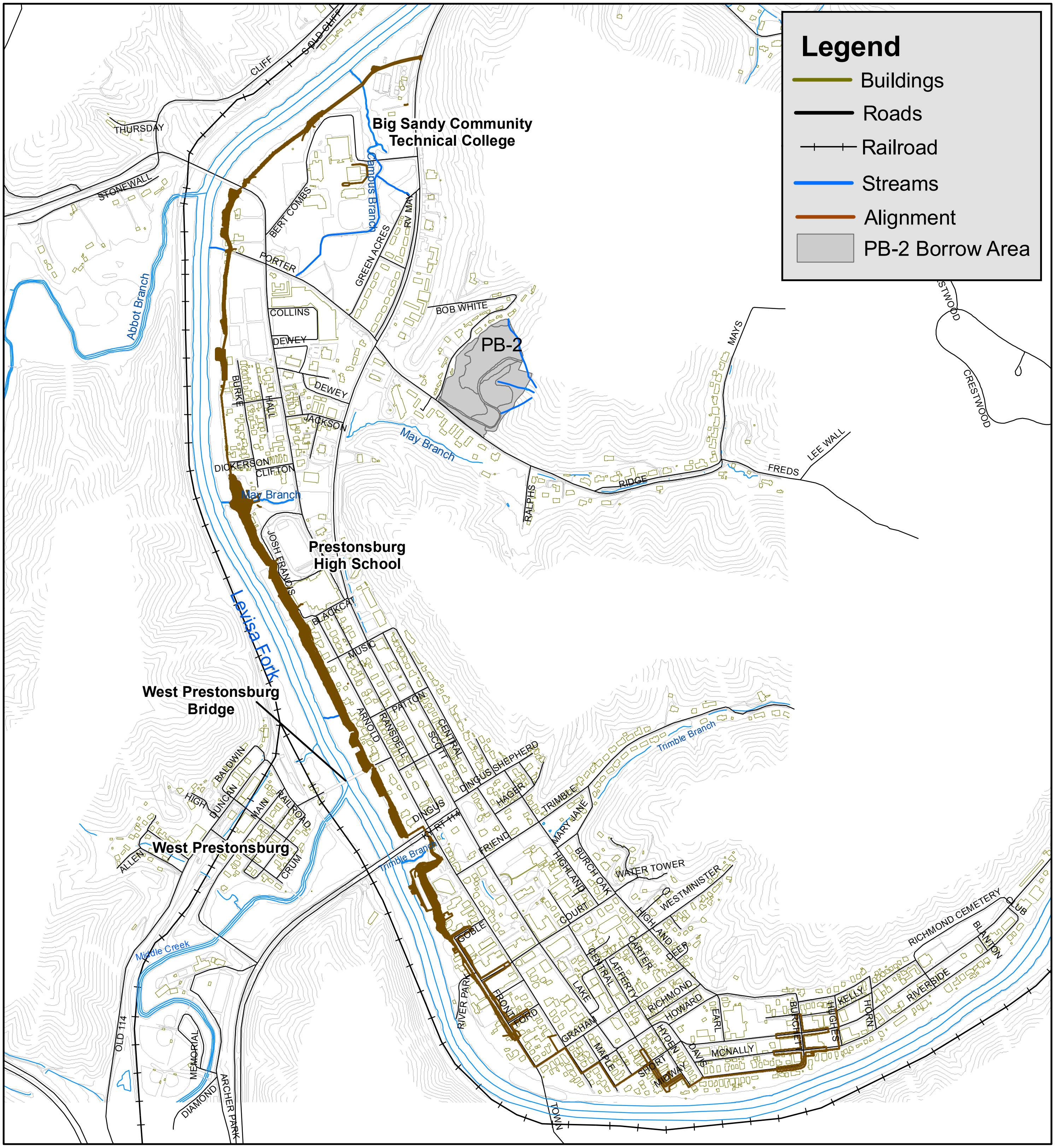
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

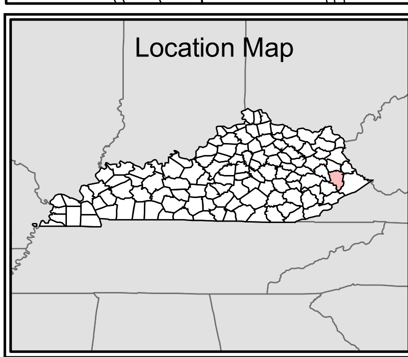
W:\USACE\Floyd-EIS\MXD\Fig1-5C_DPR3-3.mxd Mar 10, 2006 DNB

Figure

1-5C

0 0.5 1 1.5 2 Miles





Structural Measure #3
(Long Floodwall Ending At WasteWater Treatment Plant)

Prestonsburg, KY

Notes

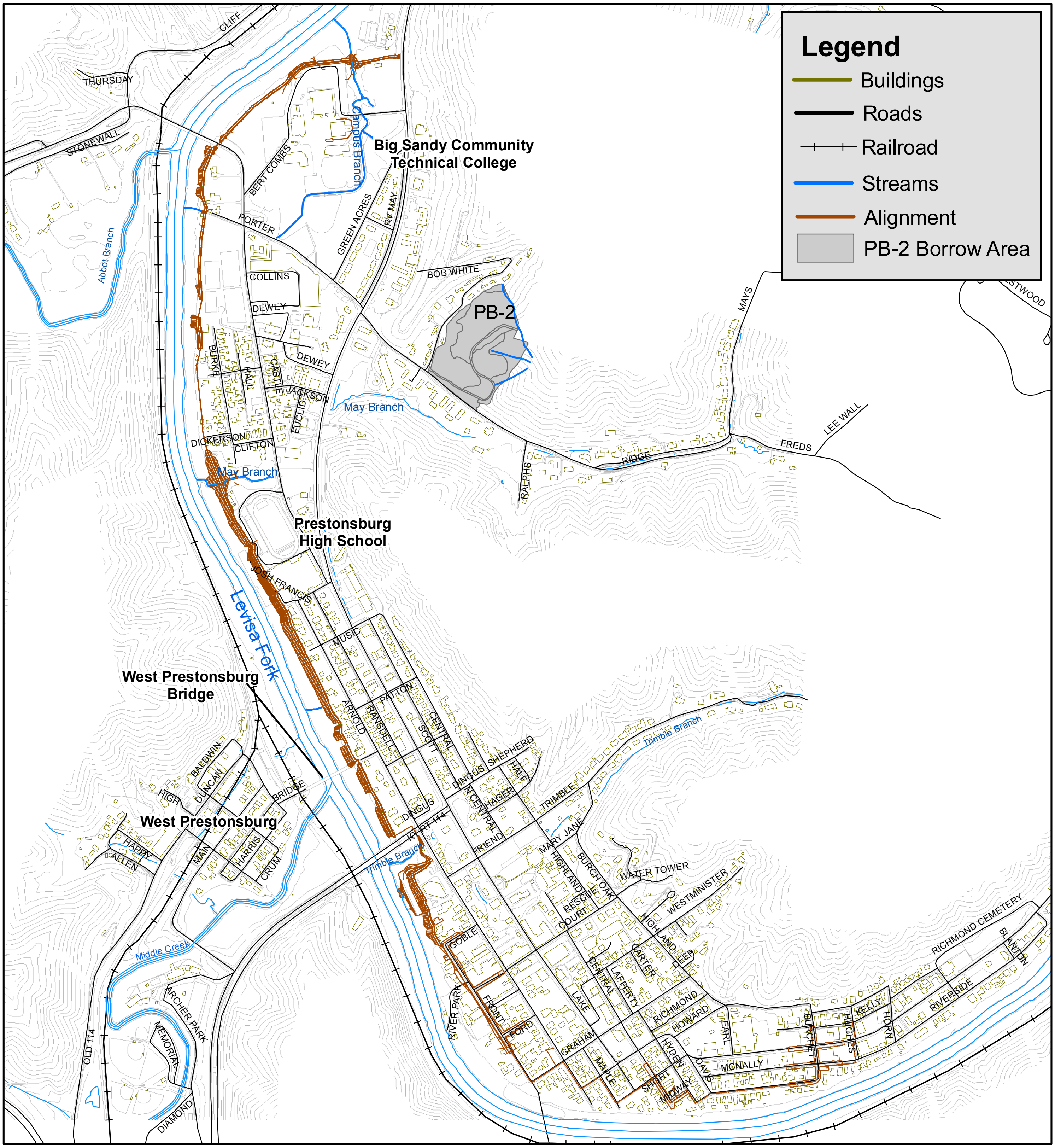
Figure **4-1**

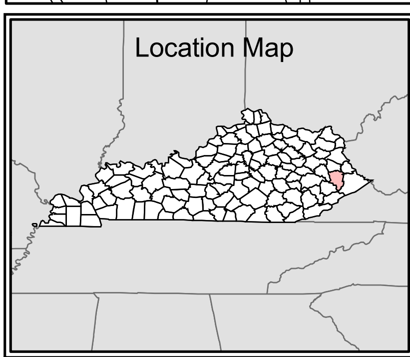
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\Fig4-1LongWall_Wastewater.mxd Mar 10, 2006 DNB

amec

0 500 1,000 1,500
Feet





Structural Measure #4
(Long Floodwall Ending At Big Sandy Community and Technical College)

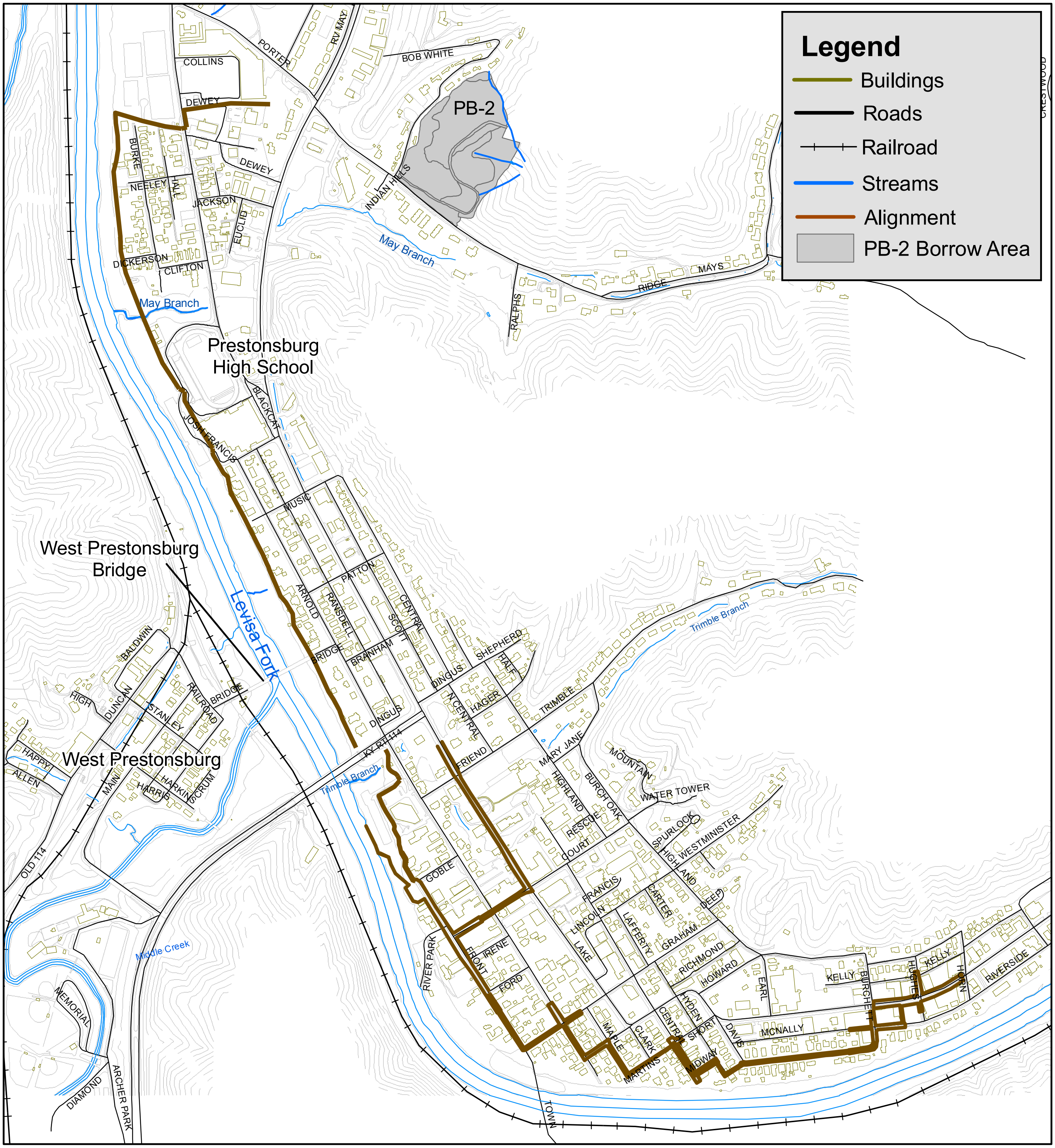
Prestonsburg, KY

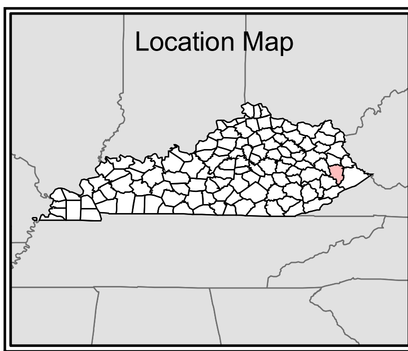
Notes

Figure
4-2

Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig4-2LongWall_CollegeStabil.mxd Mar. 10, 2006 DNB





Structural Measure #5
(Long Floodwall Ending At BlackBottom)

Prestonsburg, KY

Notes

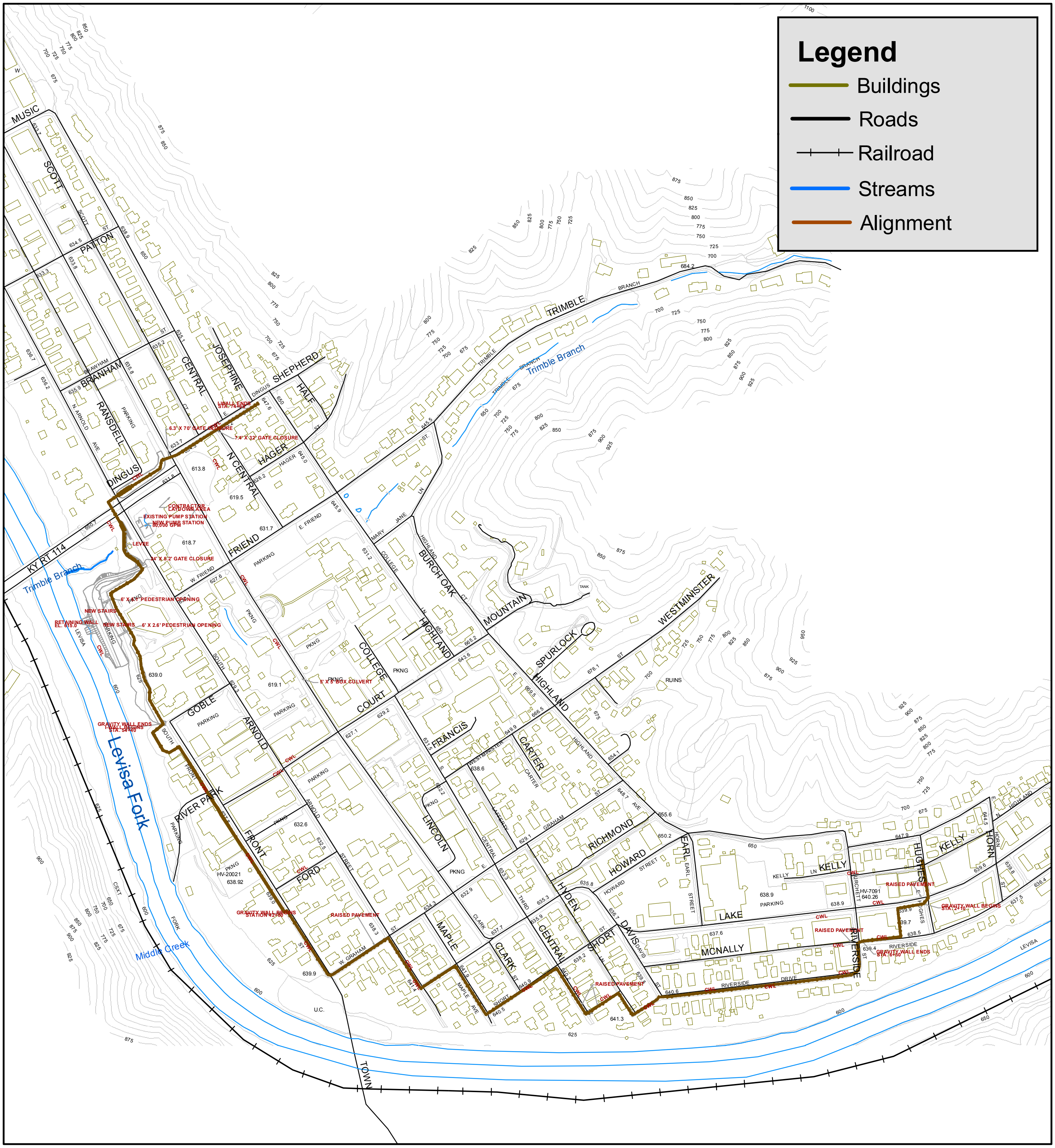
Figure
4-3

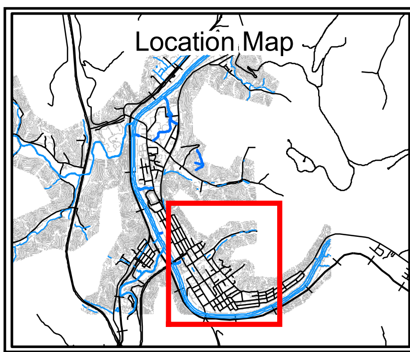
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig4-3LongWall_Blackbottom.mxd Mar 10, 2006 DNB

amec

0 400 800 1,200
Feet





Structural Measure #6
(Downtown Prestonsburg - Short Floodwall)

Prestonsburg, KY

Notes

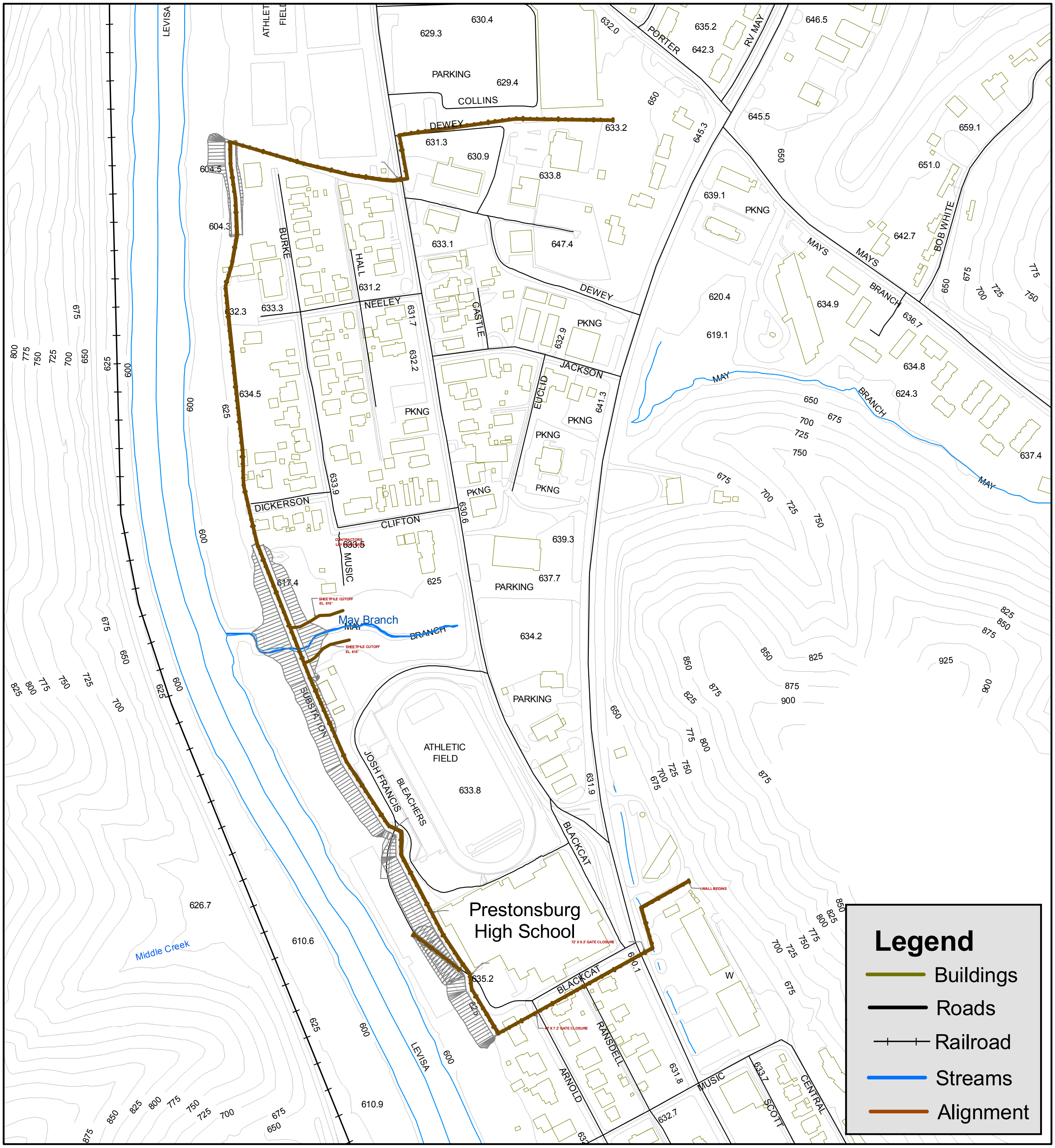
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

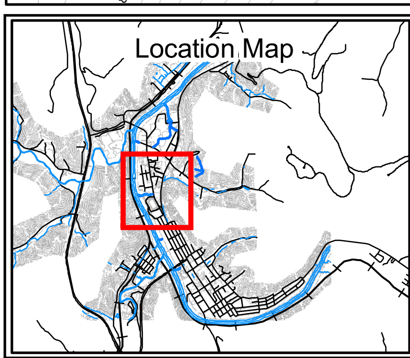
W:\USACE\Floyd-EIS\MXD\March2006\Fig4-4ShortWall_Downtown.mxd Mar 10, 2006 DNB

Figure
4-4

amec

0 200 400 600 800
Feet





Structural Measure #7
(BlackBottom Area - Short Floodwall)

Prestonsburg, KY

Notes

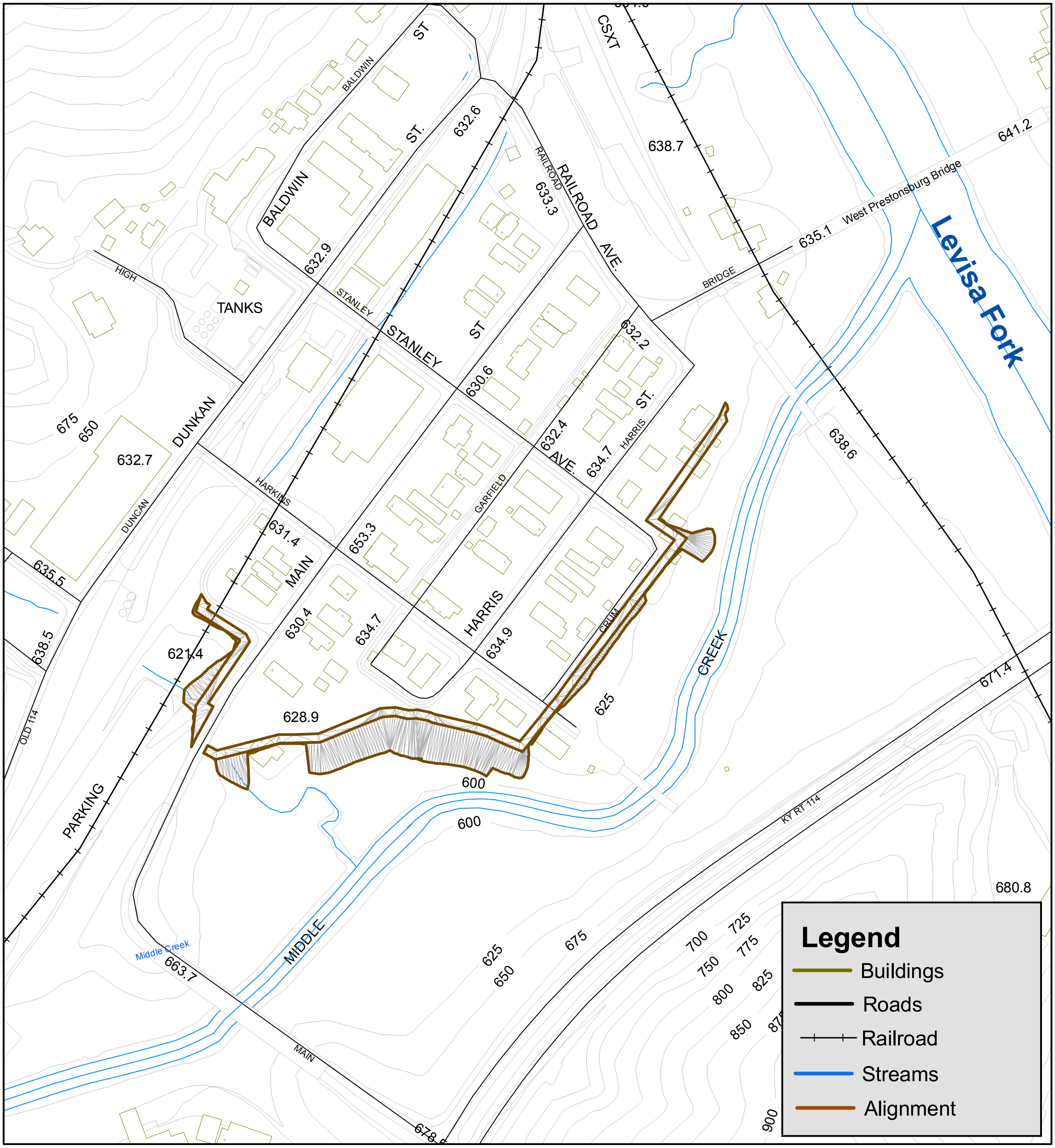
Figure

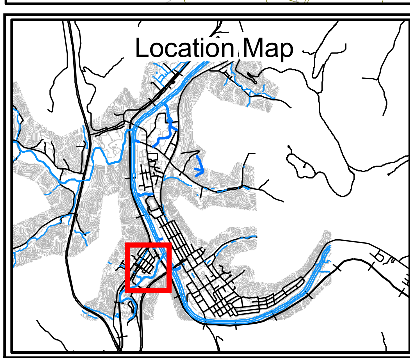
4-5

Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig4-5ShortWall_Blackbottom.mxd Mar 10, 2006 DNB

0 100 200 300 400 500
Feet





Structural Measure #8
(West Prestonsburg Area Floodwall)

Prestonsburg, KY

Notes

Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

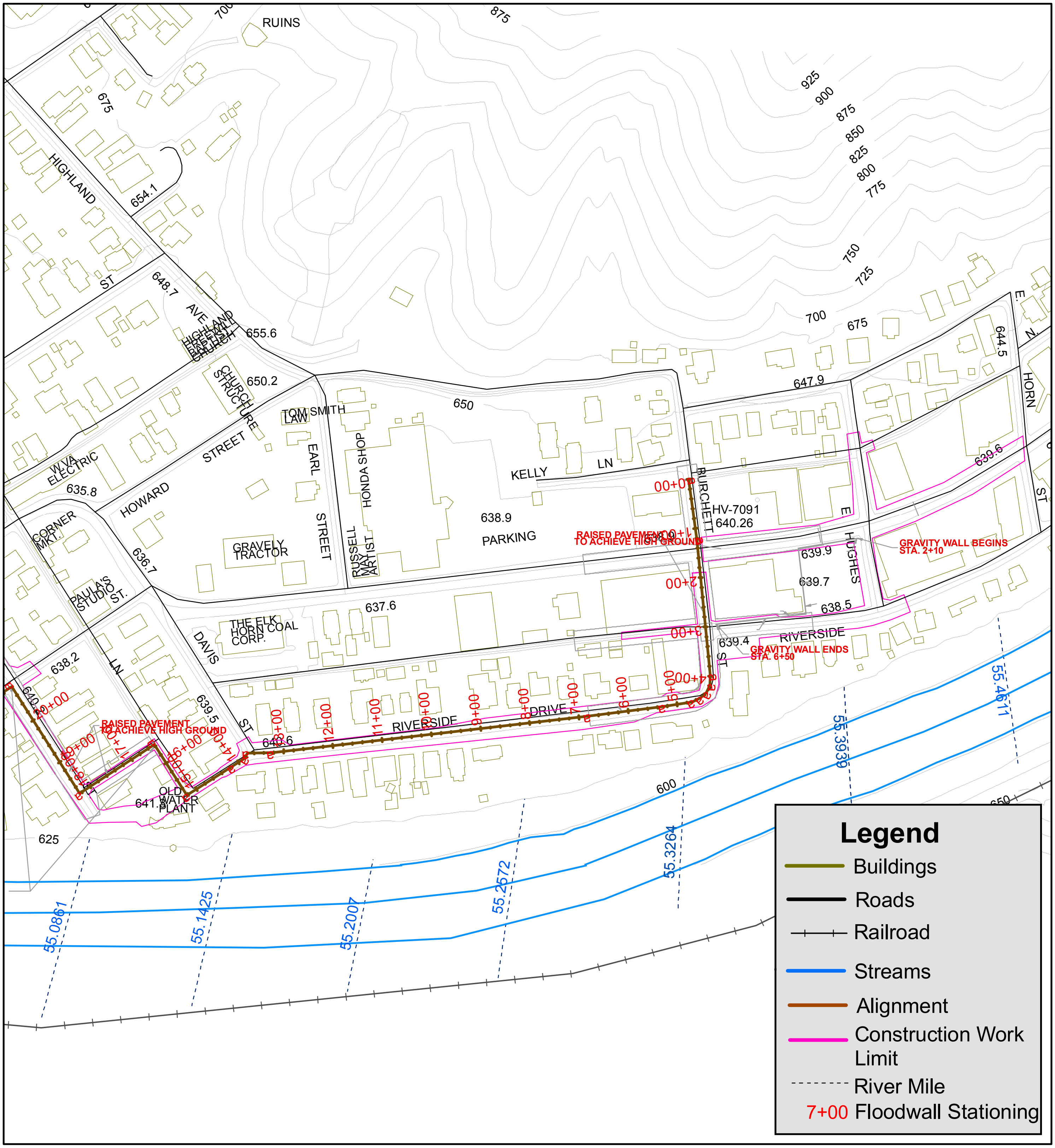
W:\USACE\Floyd-EIS\MXD\\March2006\Fig4-6WestPrestonWall.mxd   Mar 10, 2006   DNB

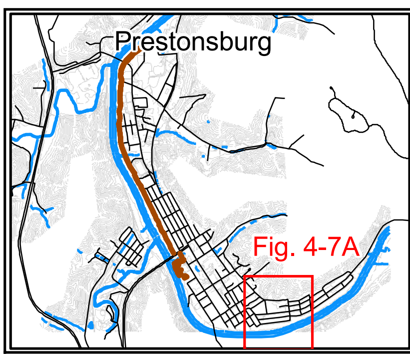
Figure

4-6

amec

0 75 150 225 300 Feet





Alignment & Construction Work Limits For Alternative Plans 2 & 3

Prestonsburg, KY

Notes

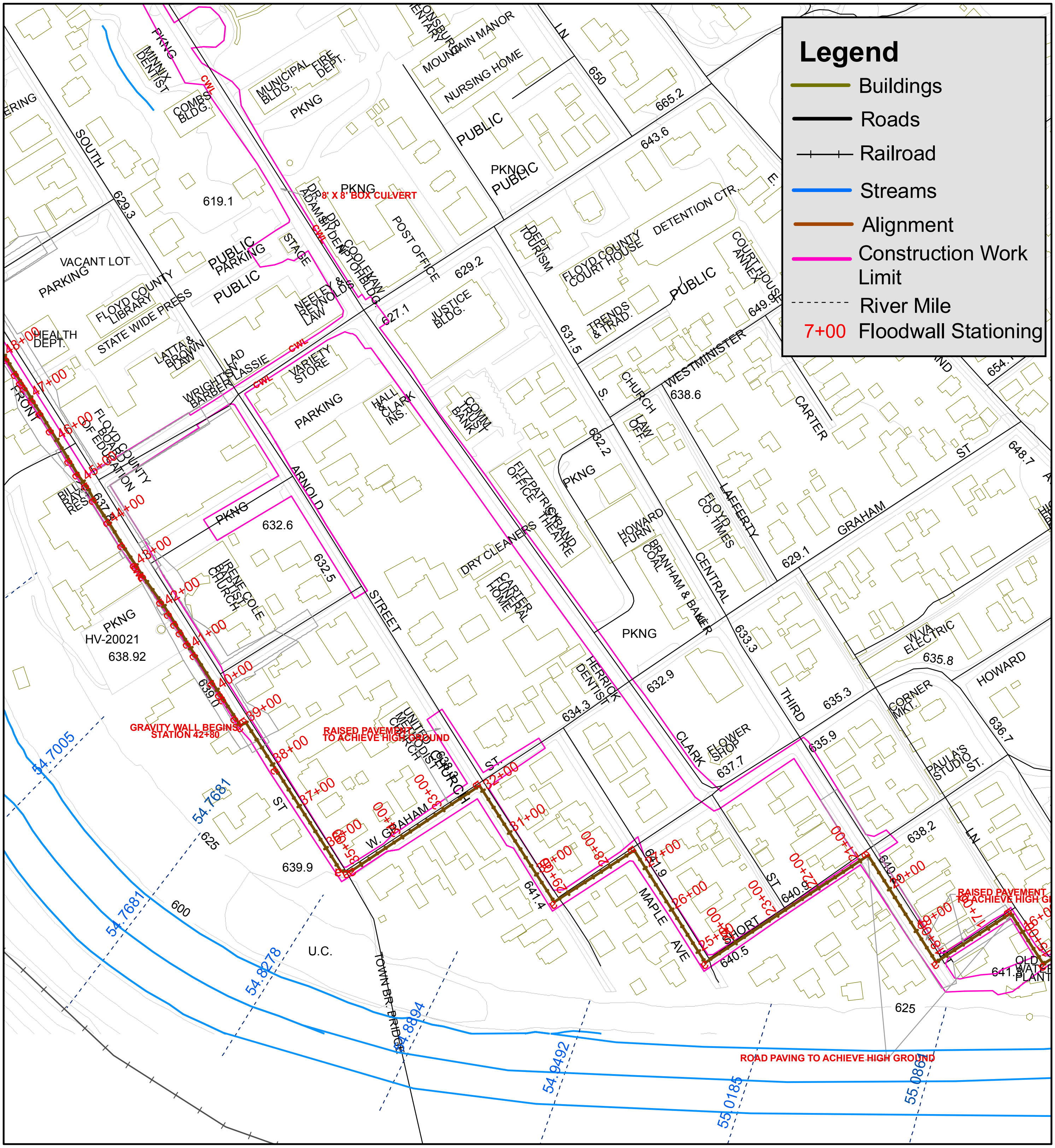
Figure **4-7A**

Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig4-7A_LongAlign.mxd Mar 10, 2006 DNB

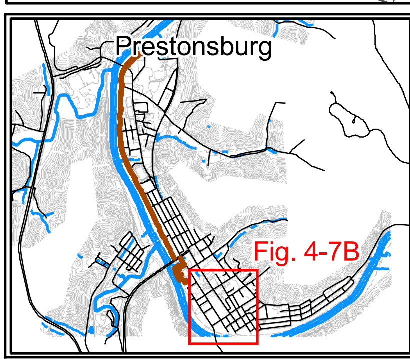
amec

0 50100 200 300 Feet



Alignment & Construction Work Limits For Alternative Plans 2 & 3

Prestonsburg, KY



Notes

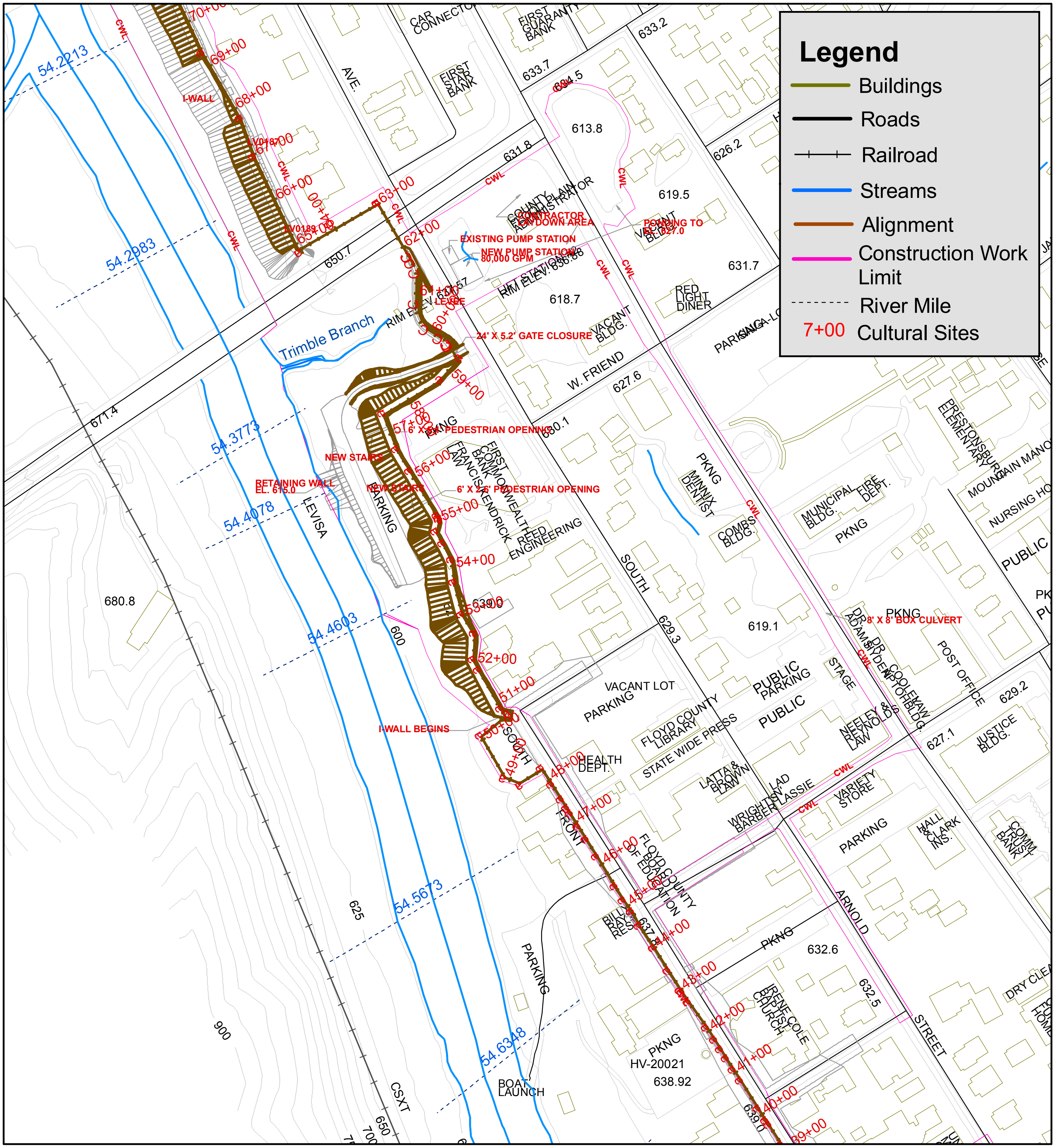
Figure **4-7B**

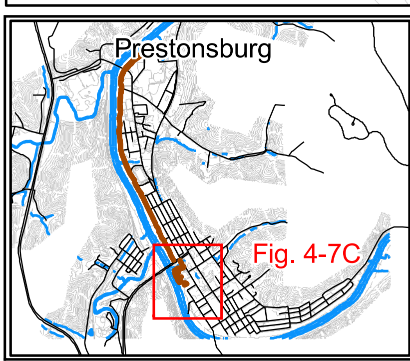
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig4-7BLongAlign.mxd Mar 10, 2006 DNB

amec

0 50 100 200 300 Feet





Alignment & Construction Work Limits
For Alternative Plans 2 & 3

Prestonsburg, KY

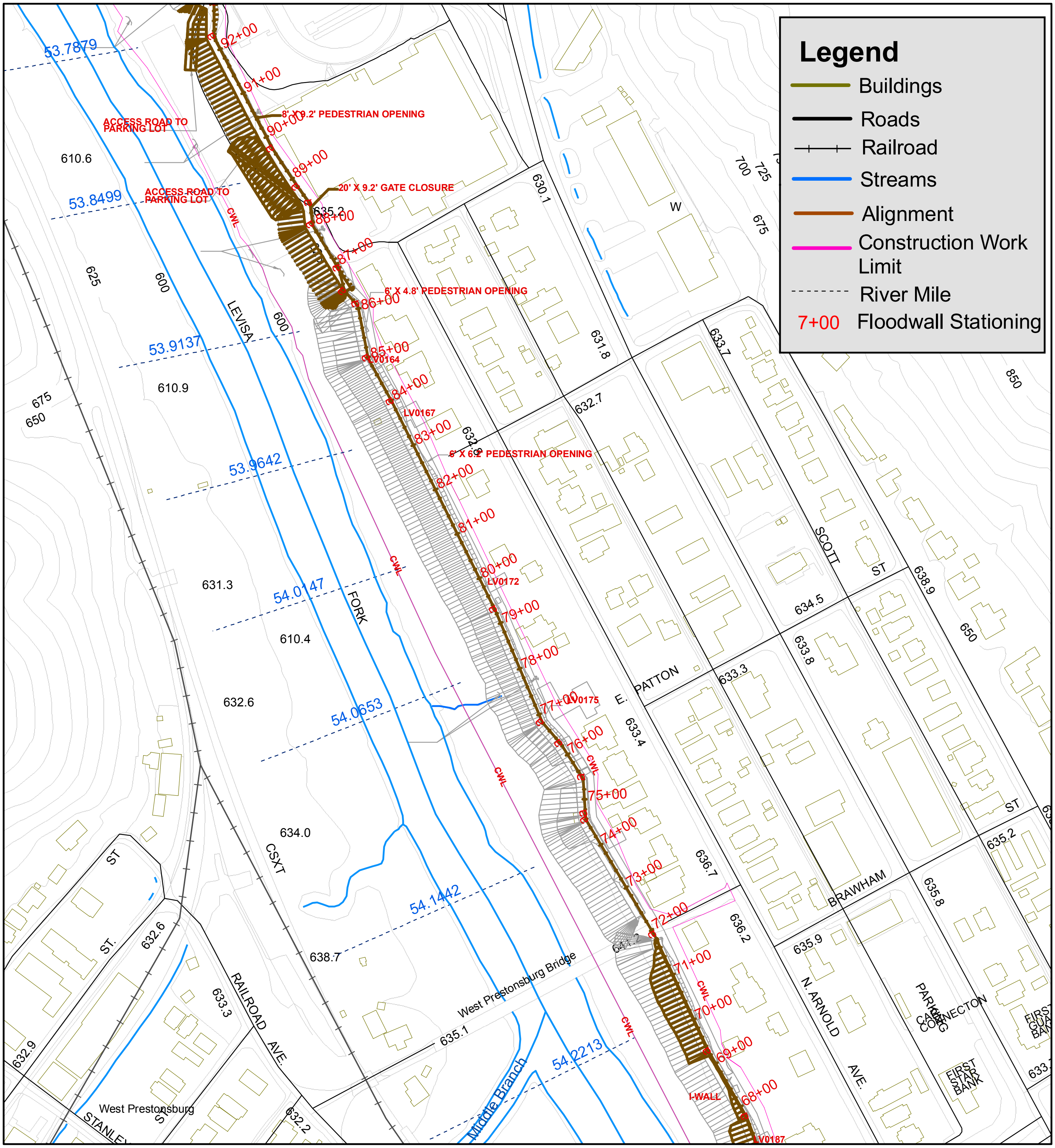
Notes

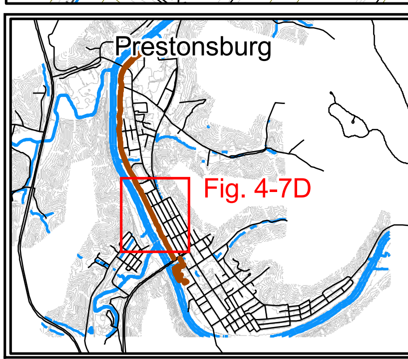
Figure
4-7C

Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

0 50 100 200 300
Feet

W:\USACE\Floyd-EIS\MXD\March2006\Fig4-7C_LongAlign.mxd Mar 10,2006 DNB





Alignment & Construction Work Limits
For Alternative Plans 2 &3

Prestonsburg, KY

Notes

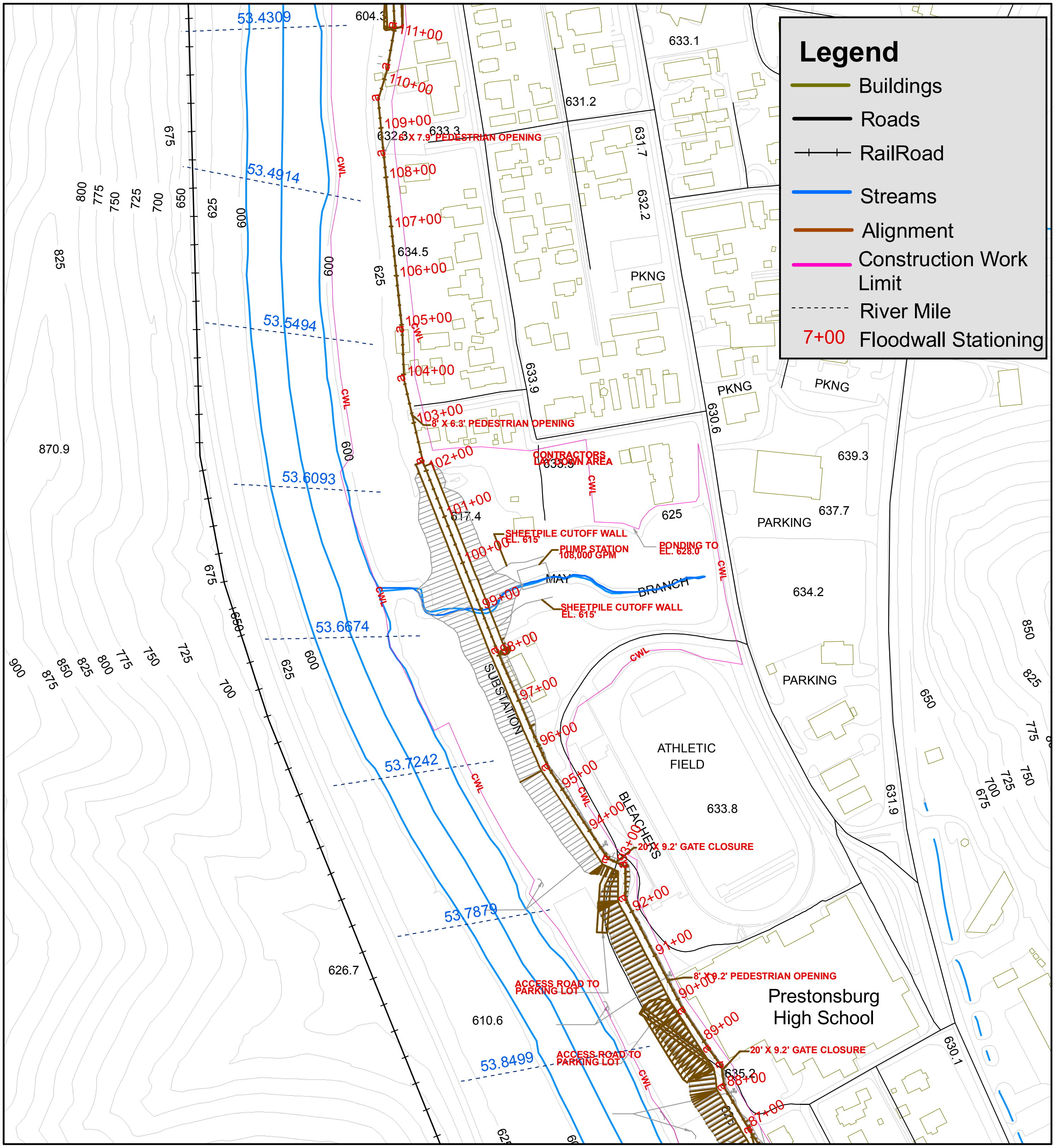
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

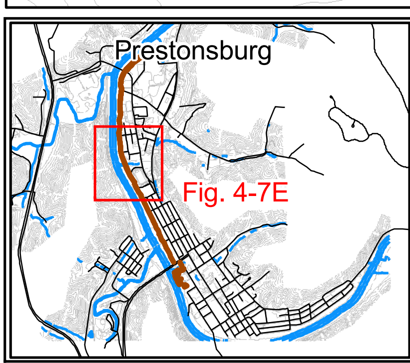
W:\USACE\Floyd-EIS\MXD\March2006\Fig4-7D_LongAlign.mxd Mar 10, 2006 DNB

Figure
4-7D

amec

0 50100 200 300
Feet





Alignment & Construction Work Limits For Alternative Plans 2 & 3

Prestonsburg, KY

Notes

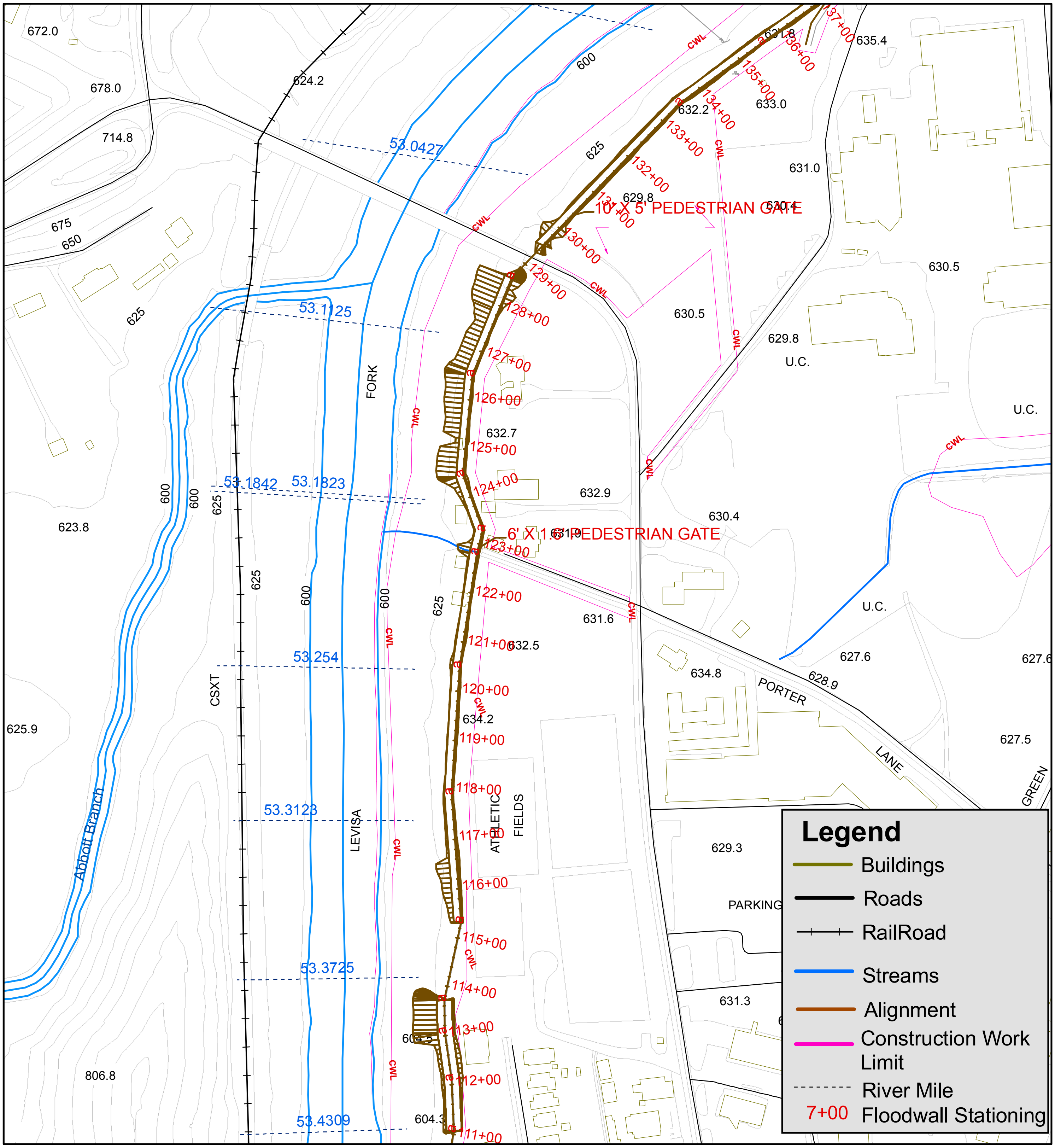
Figure **4-7E**

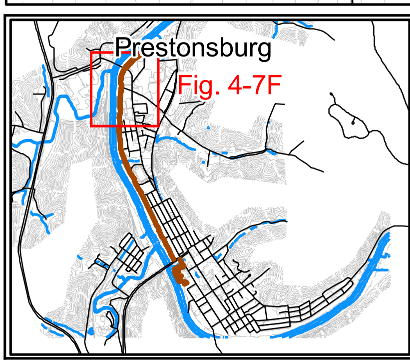
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig4-7E_LongAlign.mxd Mar 10, 2006 DNB

amec

0 50 100 200 300 Feet





Alignment & Construction Work Limits
For Alternative Plan 2

Prestonsburg, KY

Notes

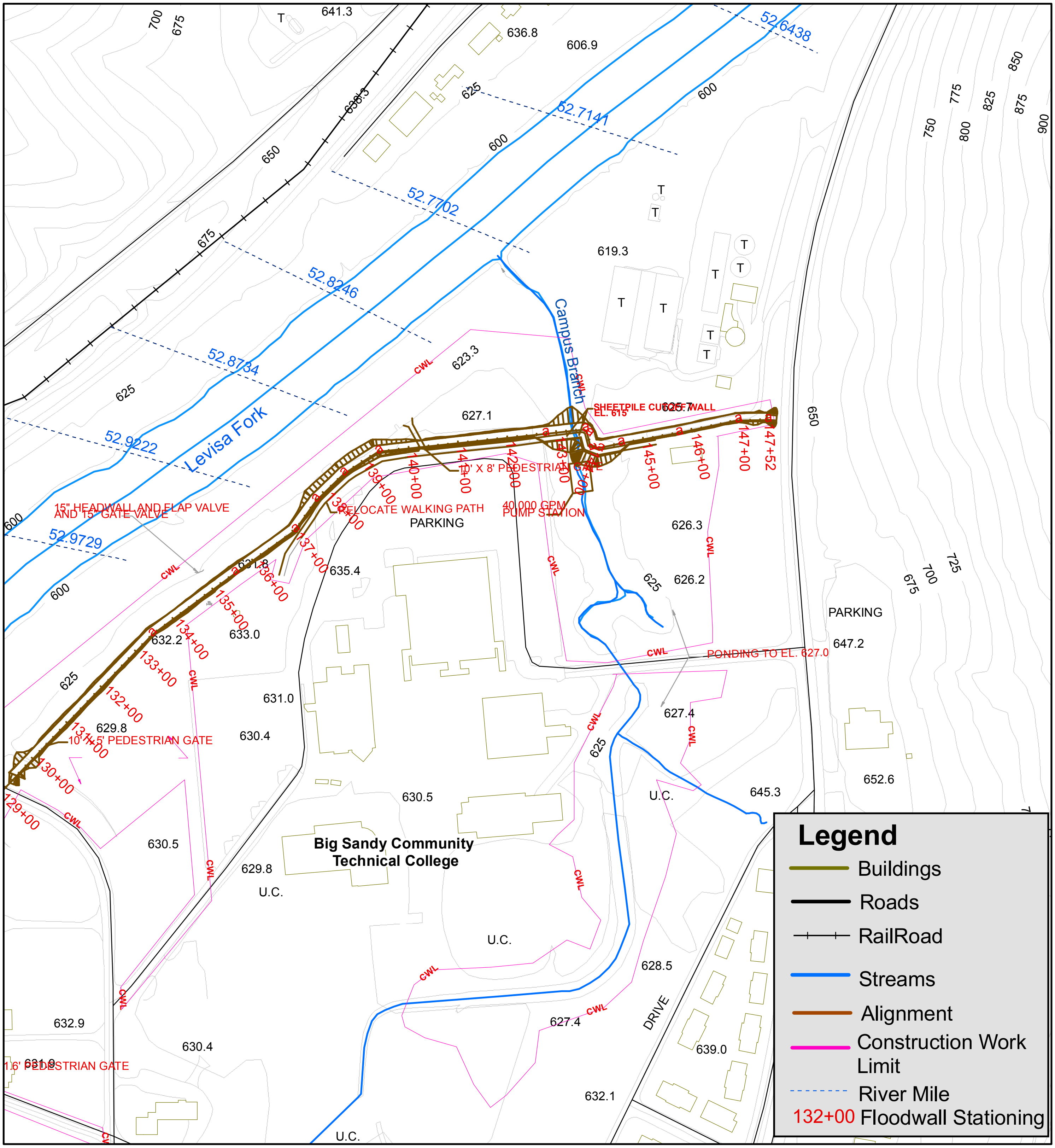
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

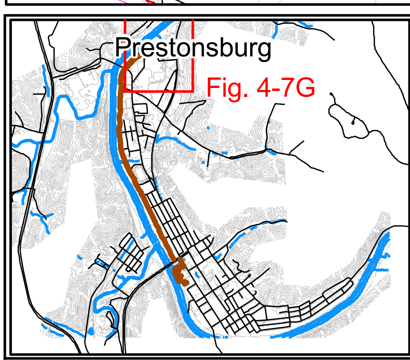
W:\USACE\Floyd-EIS\MXD\March2006\Fig4-7F_LongAlign.mxd Mar 10, 2006 DNB

Figure
4-7F

amec

0 50 100 200 300
Feet





Alignment & Construction Work Limits For Alternative Plan 2

Prestonsburg, KY

Notes

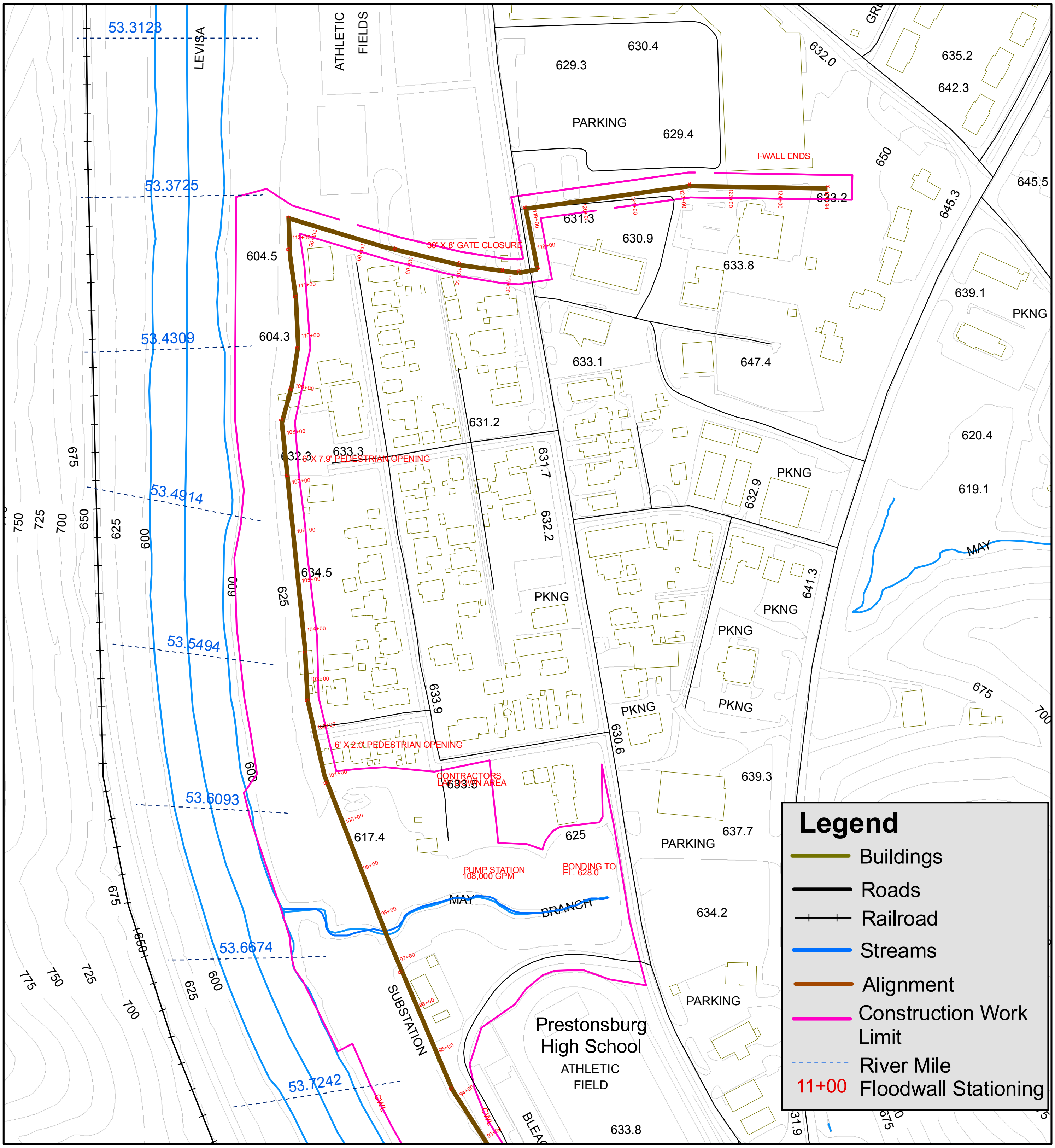
Figure

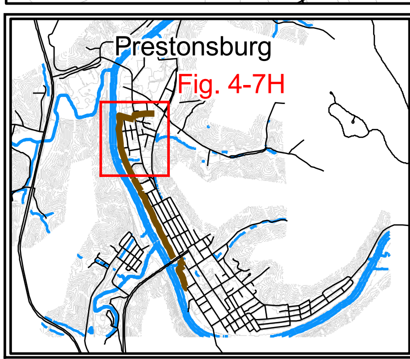
4-7G

Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig4-7G_LongAlign.mxd Mar 10, 2006 DNB

0 50 100 200 300 Feet





Alignment & Construction Work Limits
For Northern Terminus of Alternative Plan 3

Prestonsburg, KY

Notes

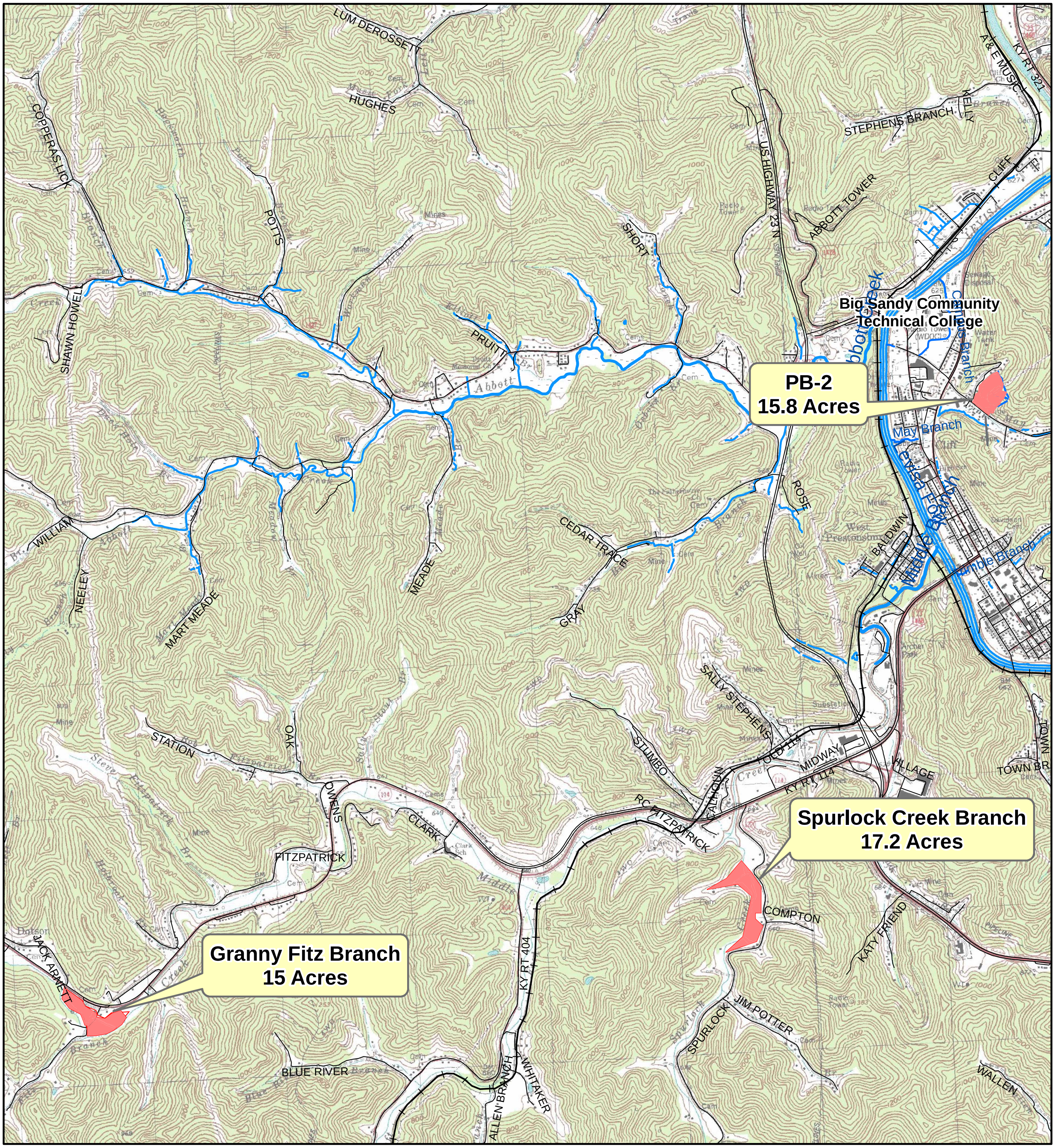
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

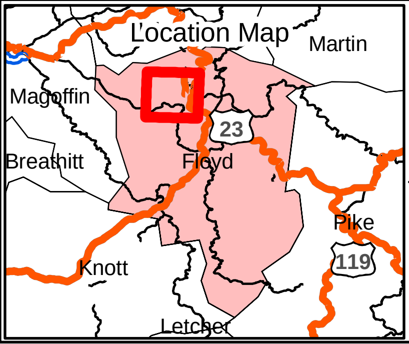
W:\USACE\Floyd-EIS\MXD\March2006\Fig4-7H_BlackBottomWall.mxd Mar 10, 2006 DNB

Figure

4-7H

0 50 100 200 300
Feet





Potential Borrow Areas

Prestonsburg, KY

Notes

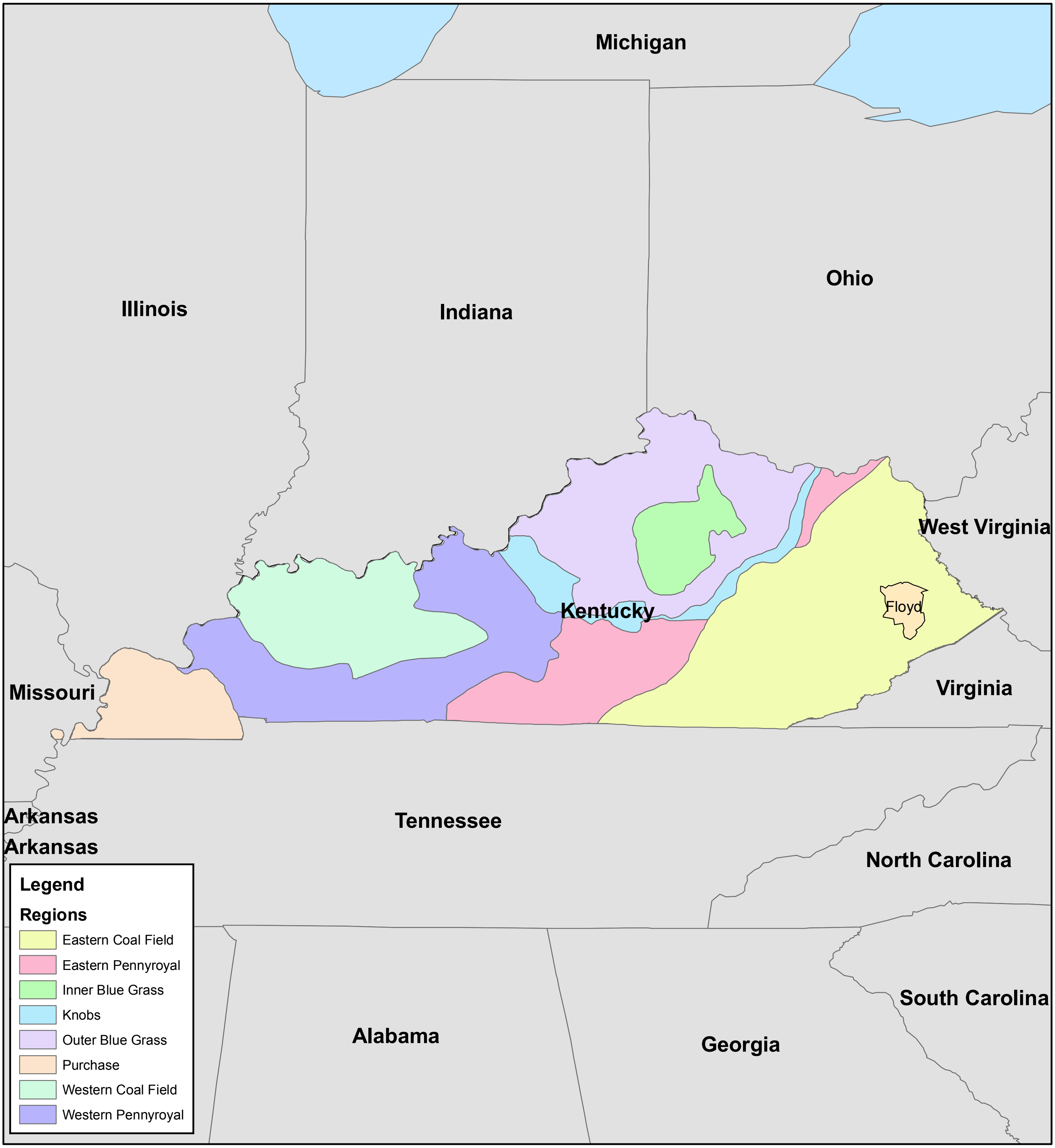
Figure

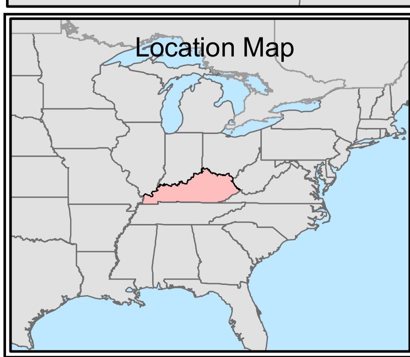
5-1

Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig5-1_Borrows.mxd Mar. 10, 2006 DNB

0 1,500 3,000 4,500
Feet





Physiographic Regions of Kentucky

Notes

Figure

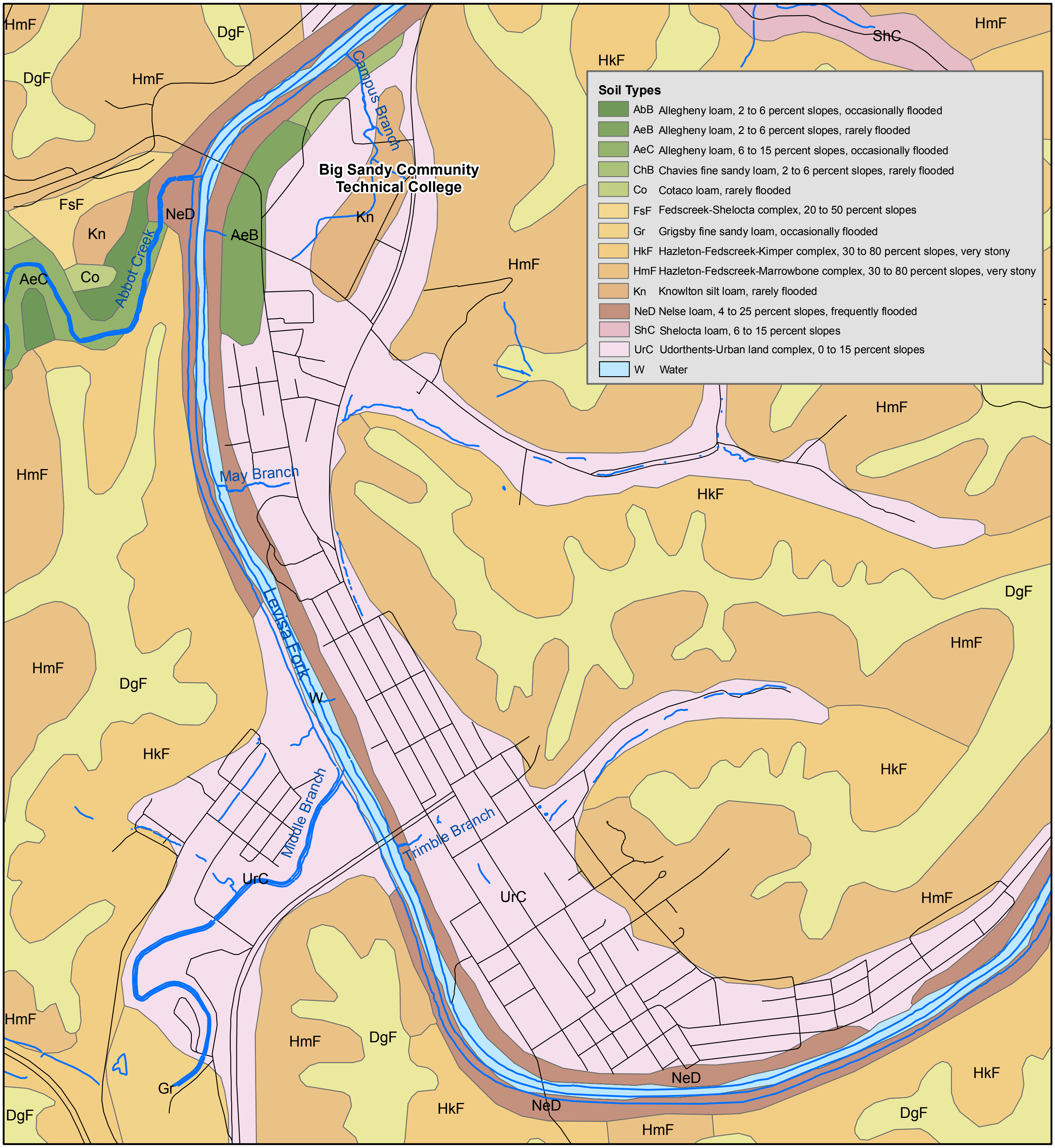
5-2

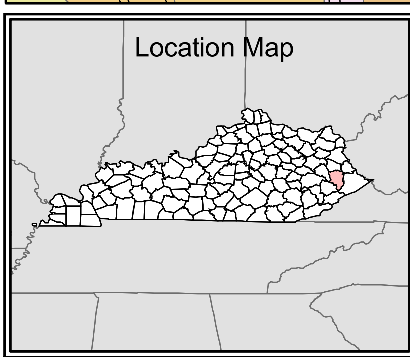
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig5-2_PhysioKY.mxd Mar 12, 2006 DNB

amec

0 15 30 60 90
Miles





Soil Types

Prestonsburg, KY

Notes

Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

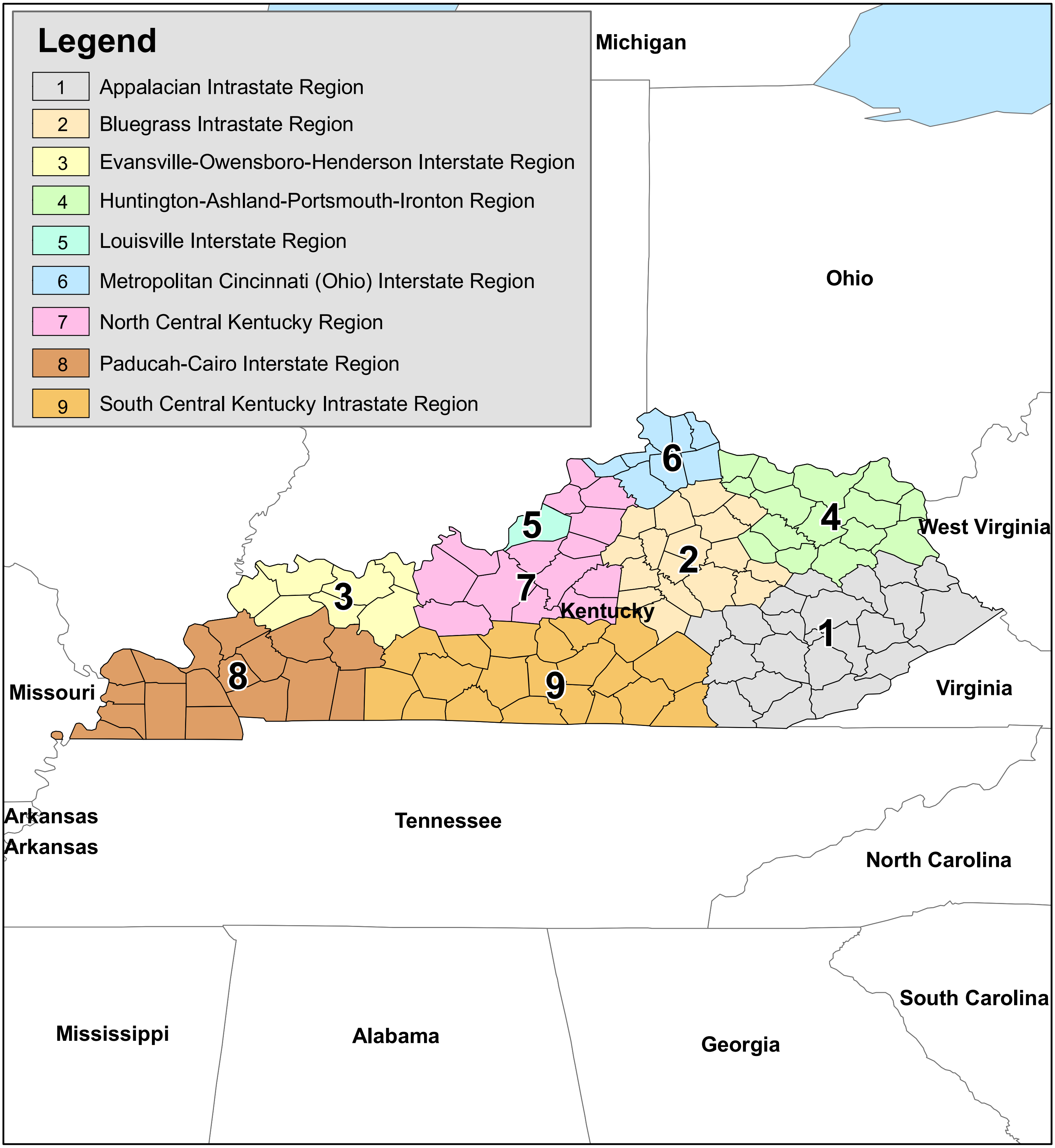
W:\USACE\Floyd-EIS\MXD\March2006\Fig5-3_Soils.mxd Mar 12, 2006 DNB

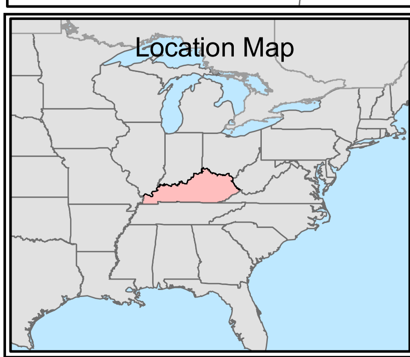
Figure

5-3

amec

0 500 1,000 1,500
Feet





Air Quality Control Regions of Kentucky

Notes

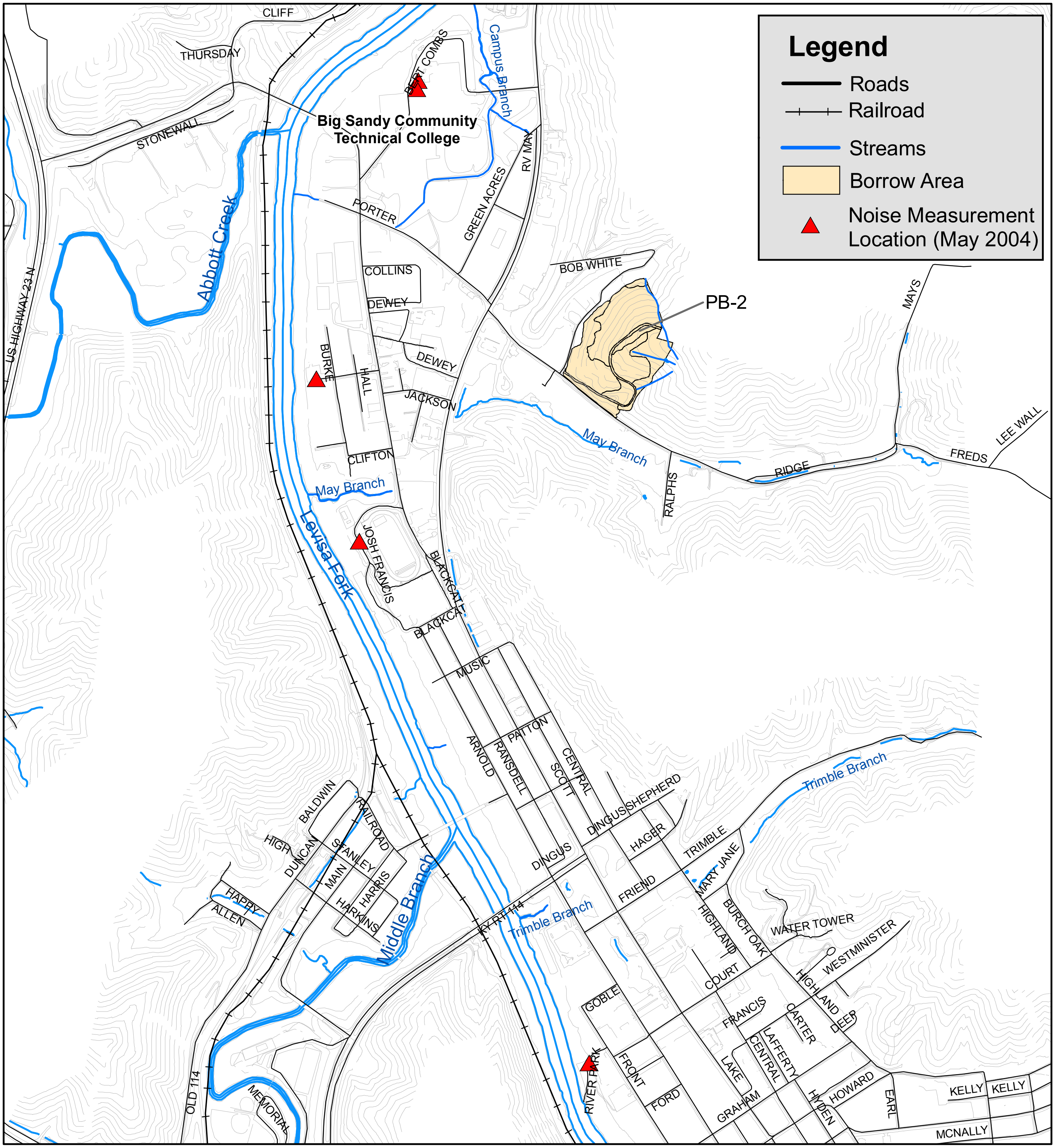
Figure 5-4

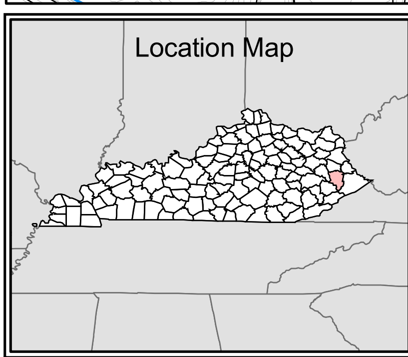
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig5-3_AirQuality.mxd Mar 12, 2006 DNB

amec

0 15 30 60 90 Miles





Noise Measurement Locations (May 2004)

Prestonsburg, KY

Notes

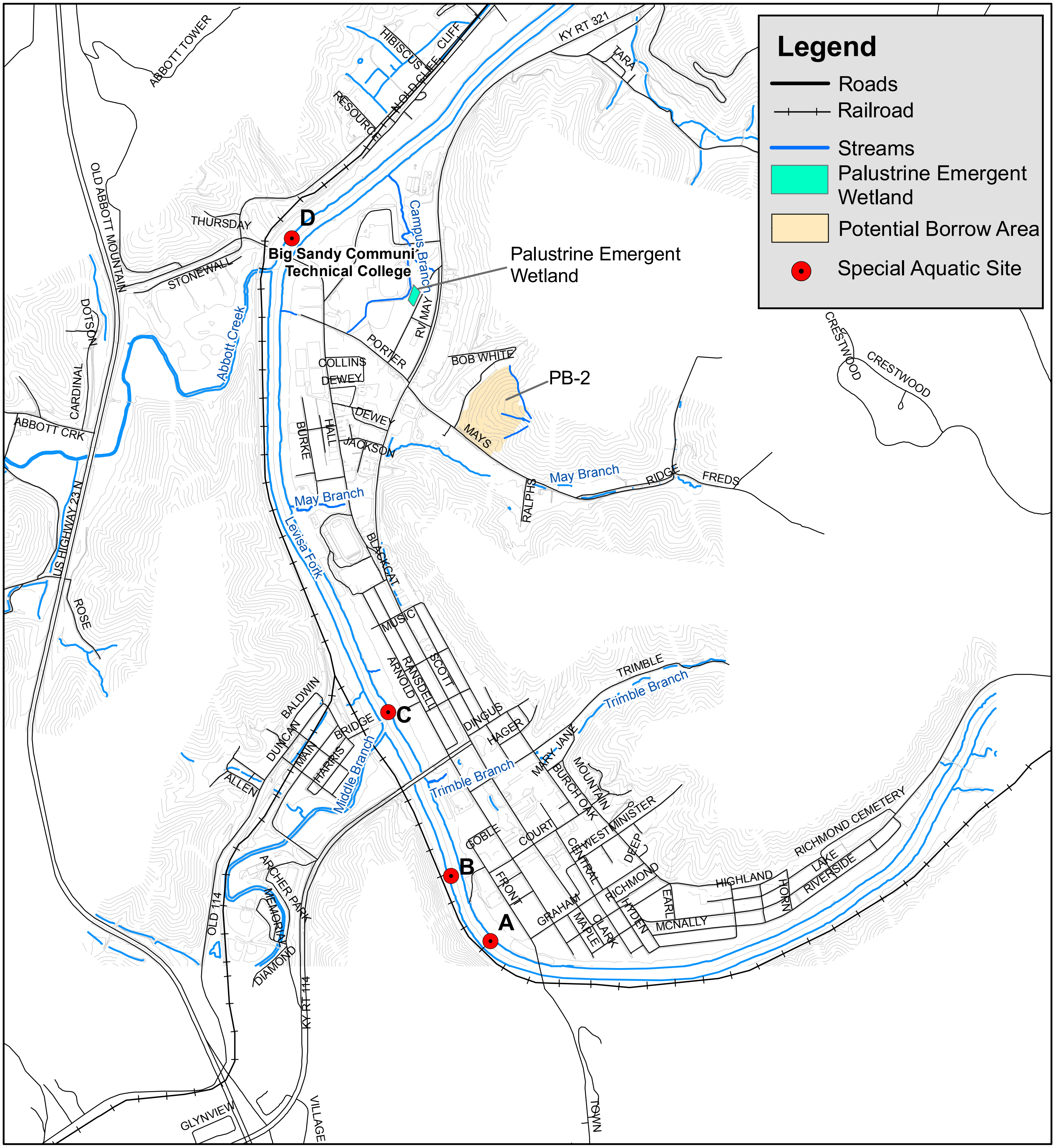
Figure **5-5**

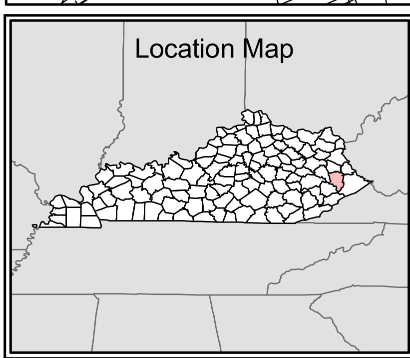
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig5-4_Noise.mxd Mar 12, 2006 DNB

amec

0 500 1,000 Feet





Surface Water Features And Wetlands

Prestonsburg, KY

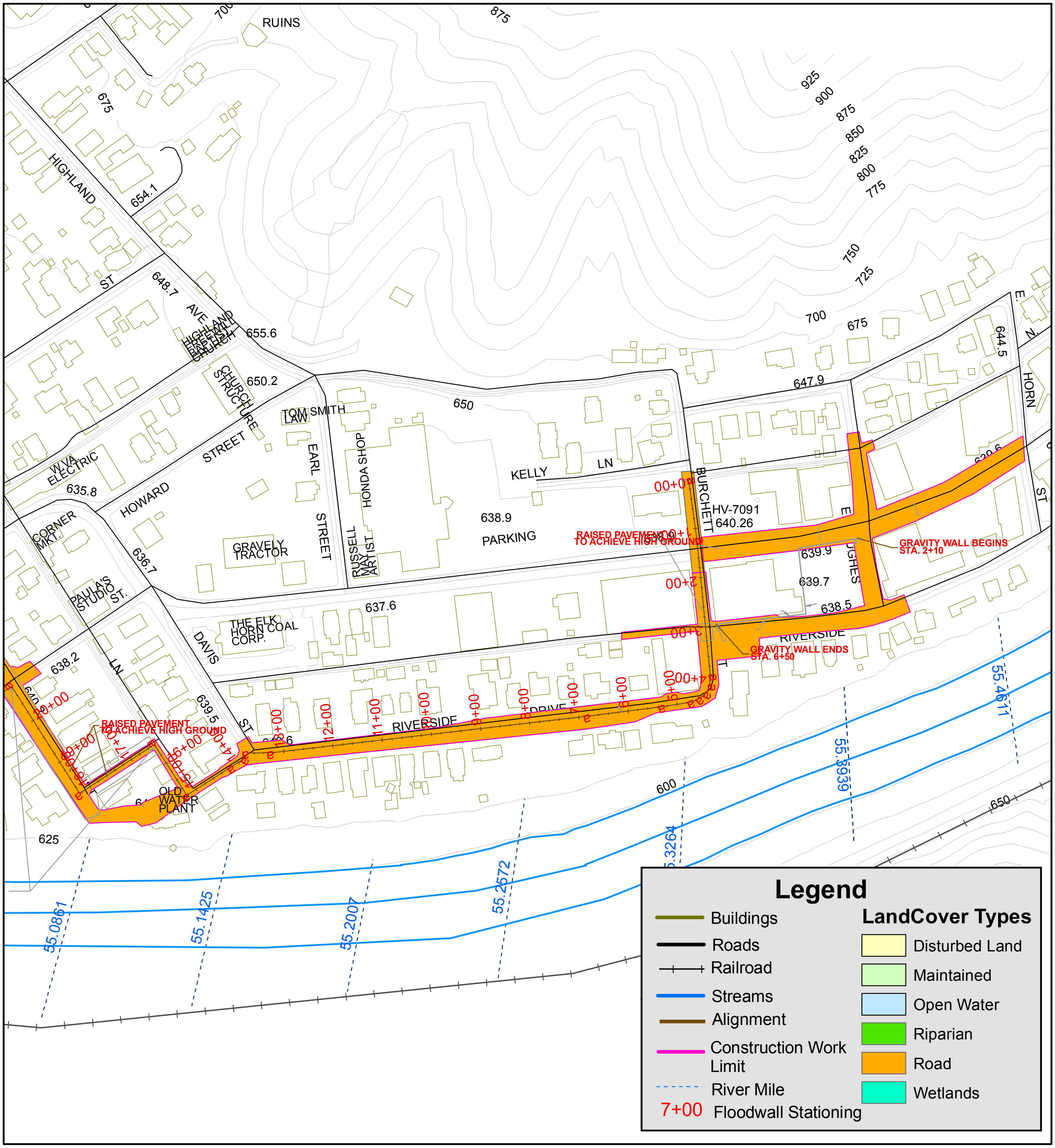
Notes

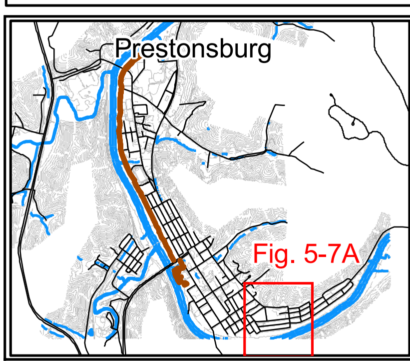
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig5-5_WaterFeatures.mxd Mar 12, 2006 DNB

Figure **5-6**

0 1,000 2,000 Feet





Land Cover Within The Construction Work Limits For Alternative Plans 2 & 3

Prestonsburg, KY

Notes

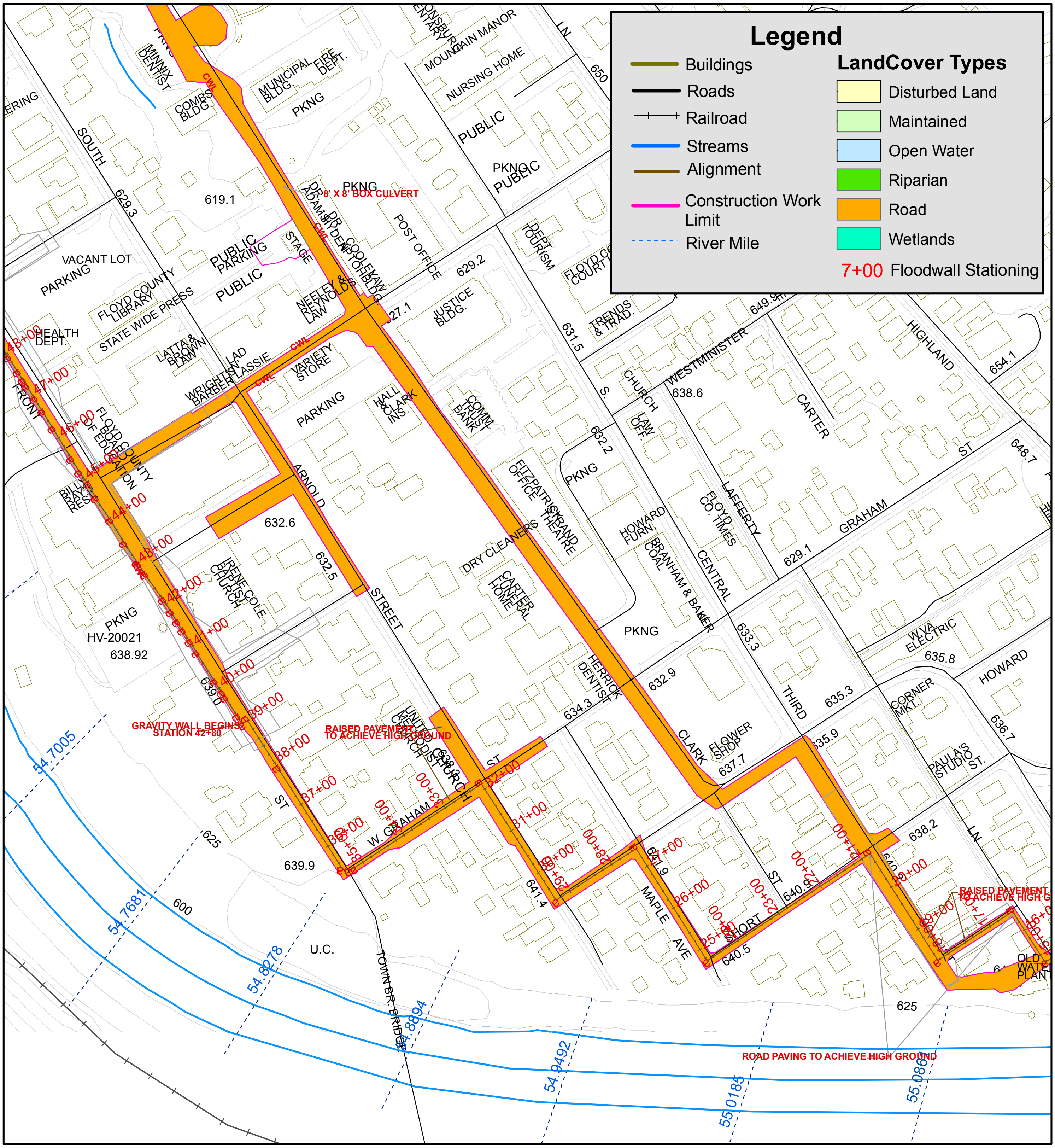
Figure **5-7A**

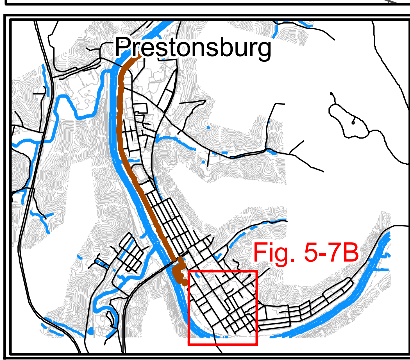
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig5-7ALU_LongWall.mxd Mar 12, 2006 DNB

amec

0 50100 200 300 Feet





Land Cover Within The Construction Work Limits For Alternative Plans 2 & 3

Prestonsburg, KY

Notes

Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

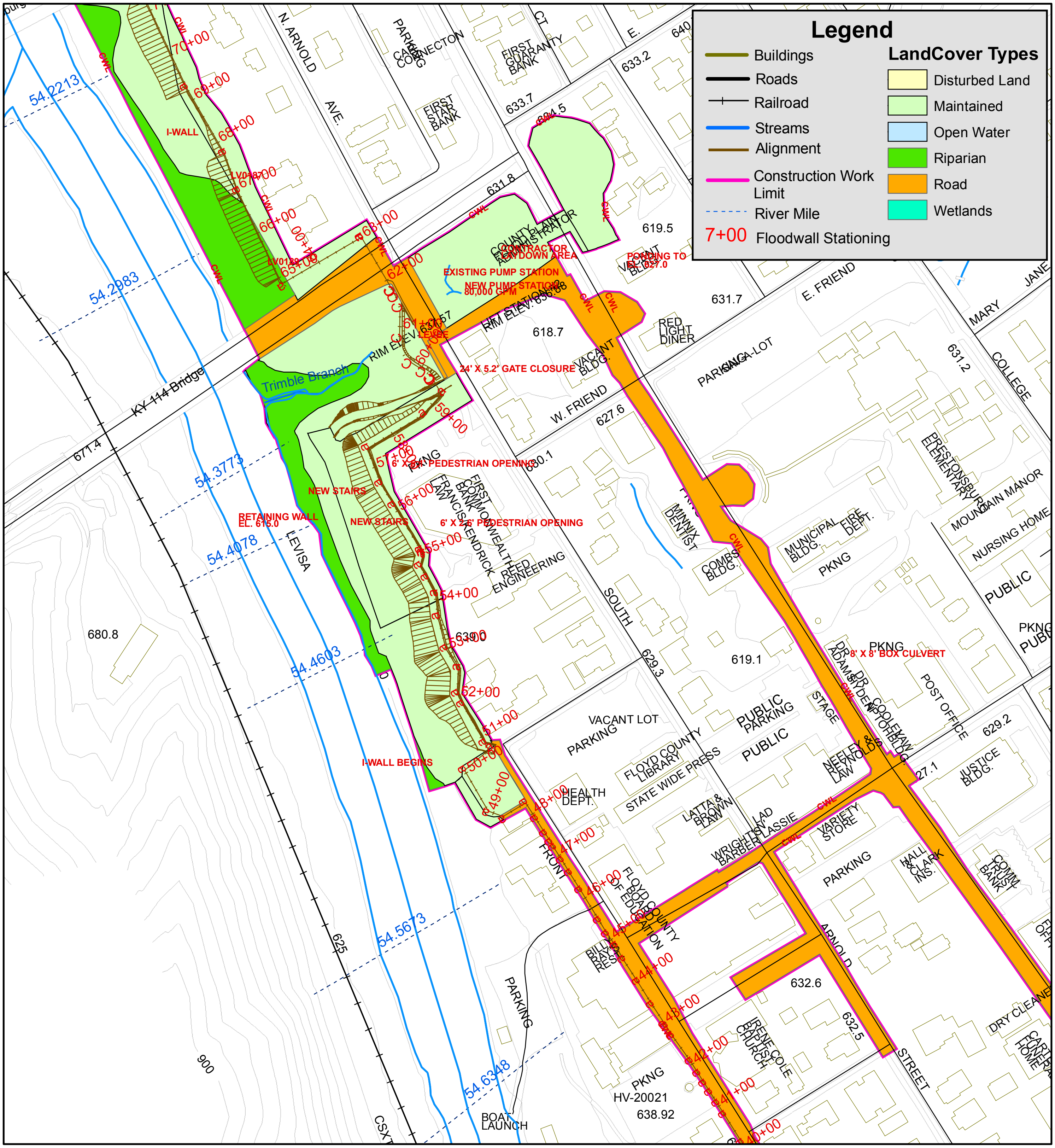
W:\USACE\Floyd-EIS\MXD\March2006\Fig5-7BLU_LongWall.mxd Mar 12, 2006 DNB

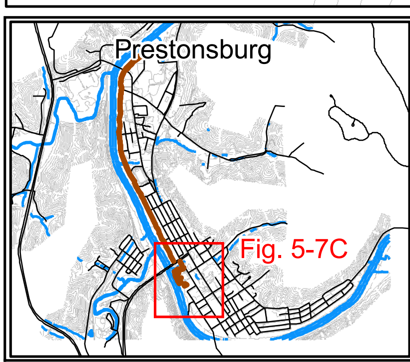
Figure

5-7B

amec

0 50100 200 300
Feet





Land Cover Within The Construction Work Limits For Alternative Plans 2 & 3

Prestonsburg, KY

Notes

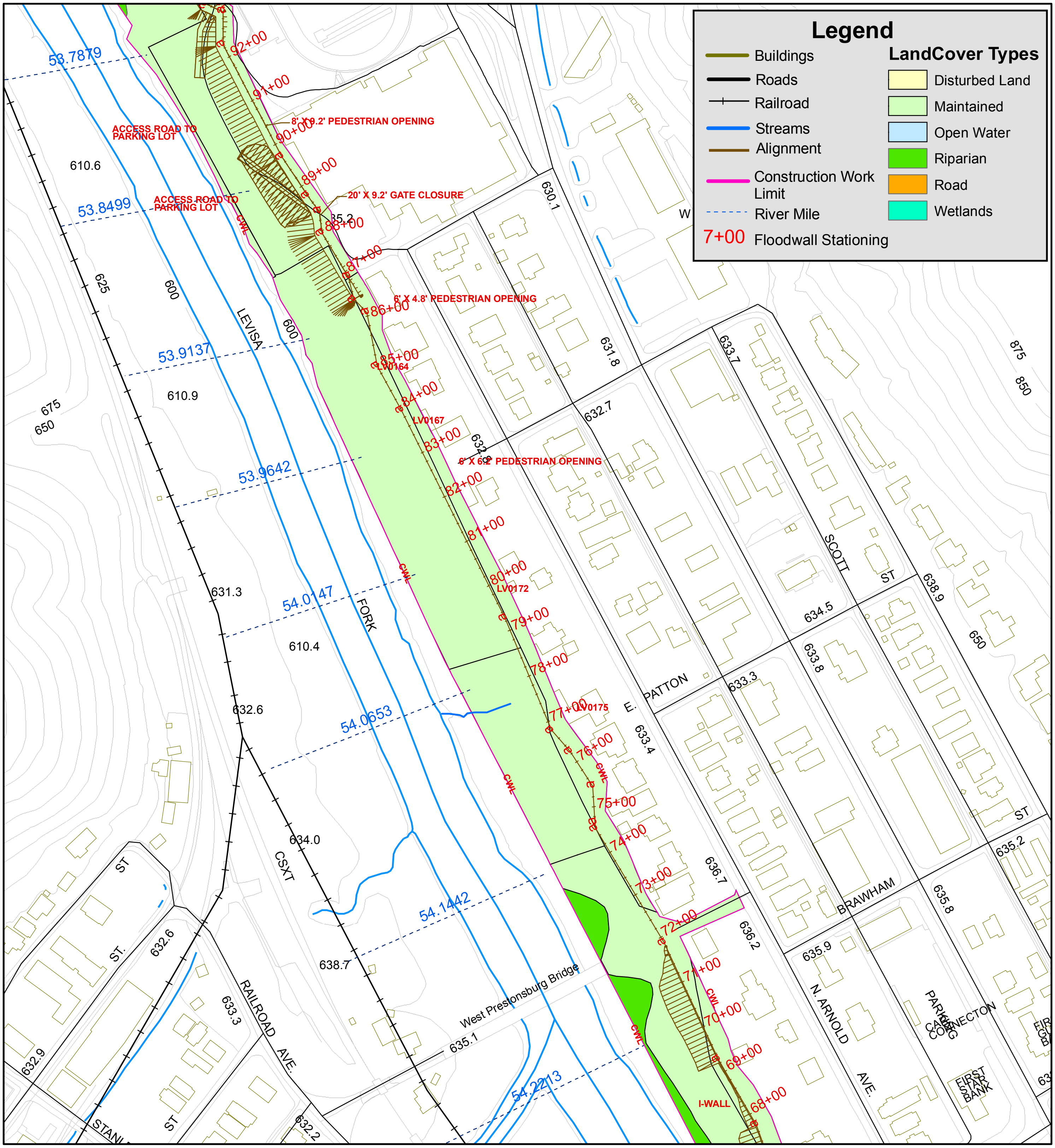
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

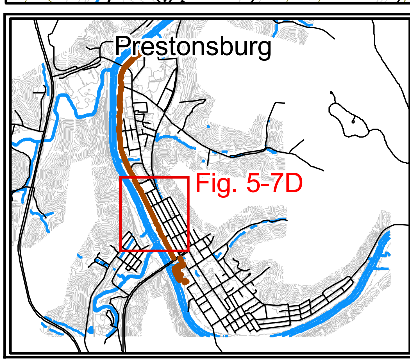
W:\USACE\Floyd-EIS\MXD\March2006\Fig5-7C_LU_LongWall.mxd Mar 12, 2006 DNB

Figure
5-7C

amec

0 50 100 200 300 Feet





Land Cover Within The Construction Work Limits For Alternative Plans 2 & 3

Prestonsburg, KY

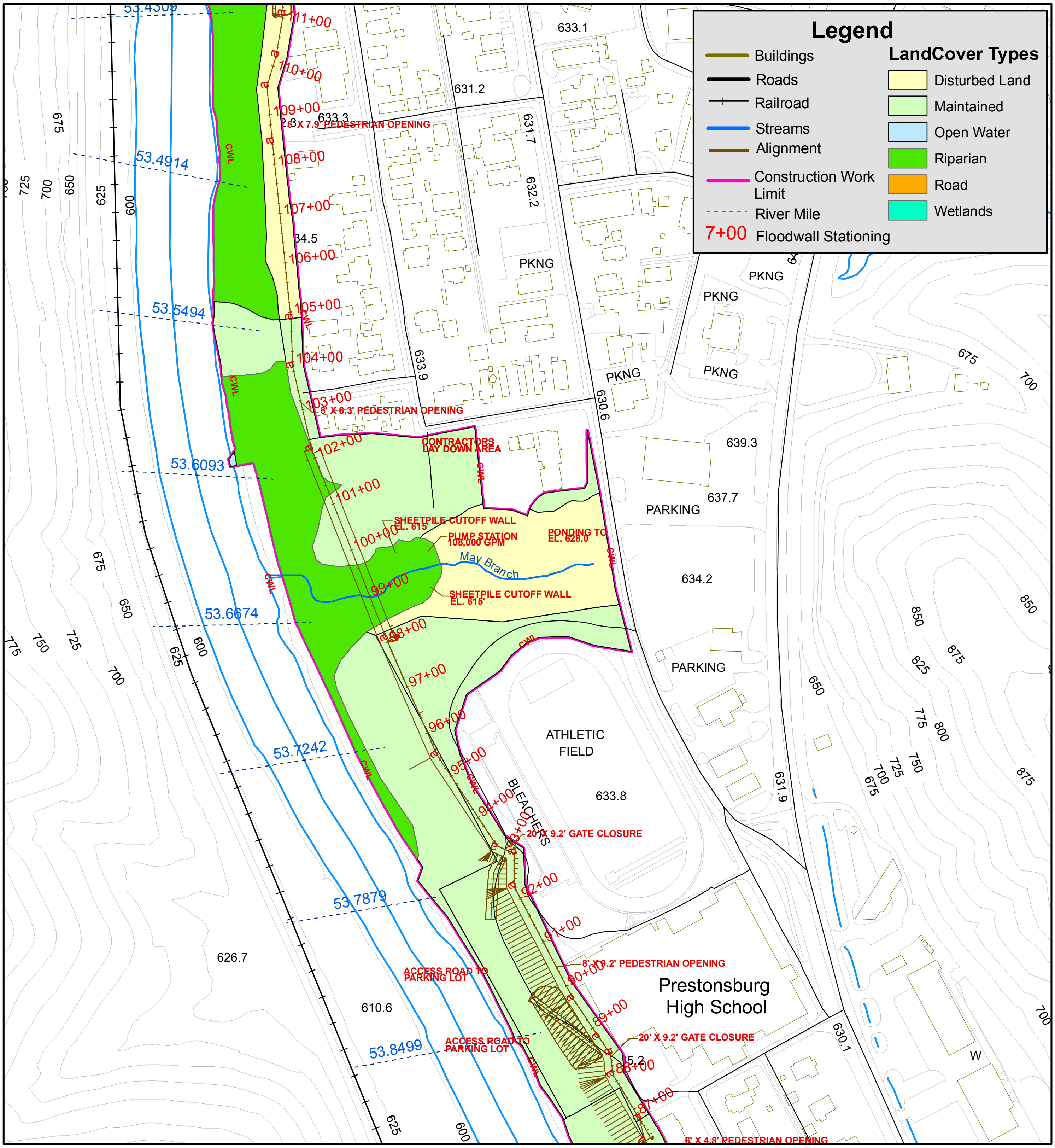
Notes

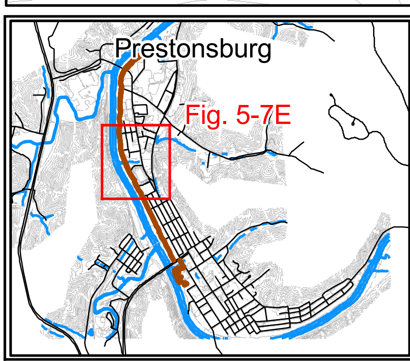
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig5-7D_LU_LongWall.mxd Mar 12, 2006 DNB

Figure **5-7D**

0 50100 200 300 Feet





Land Cover Within The Construction Work Limits For Alternative Plan 2 & 3

Prestonsburg, KY

Notes

Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

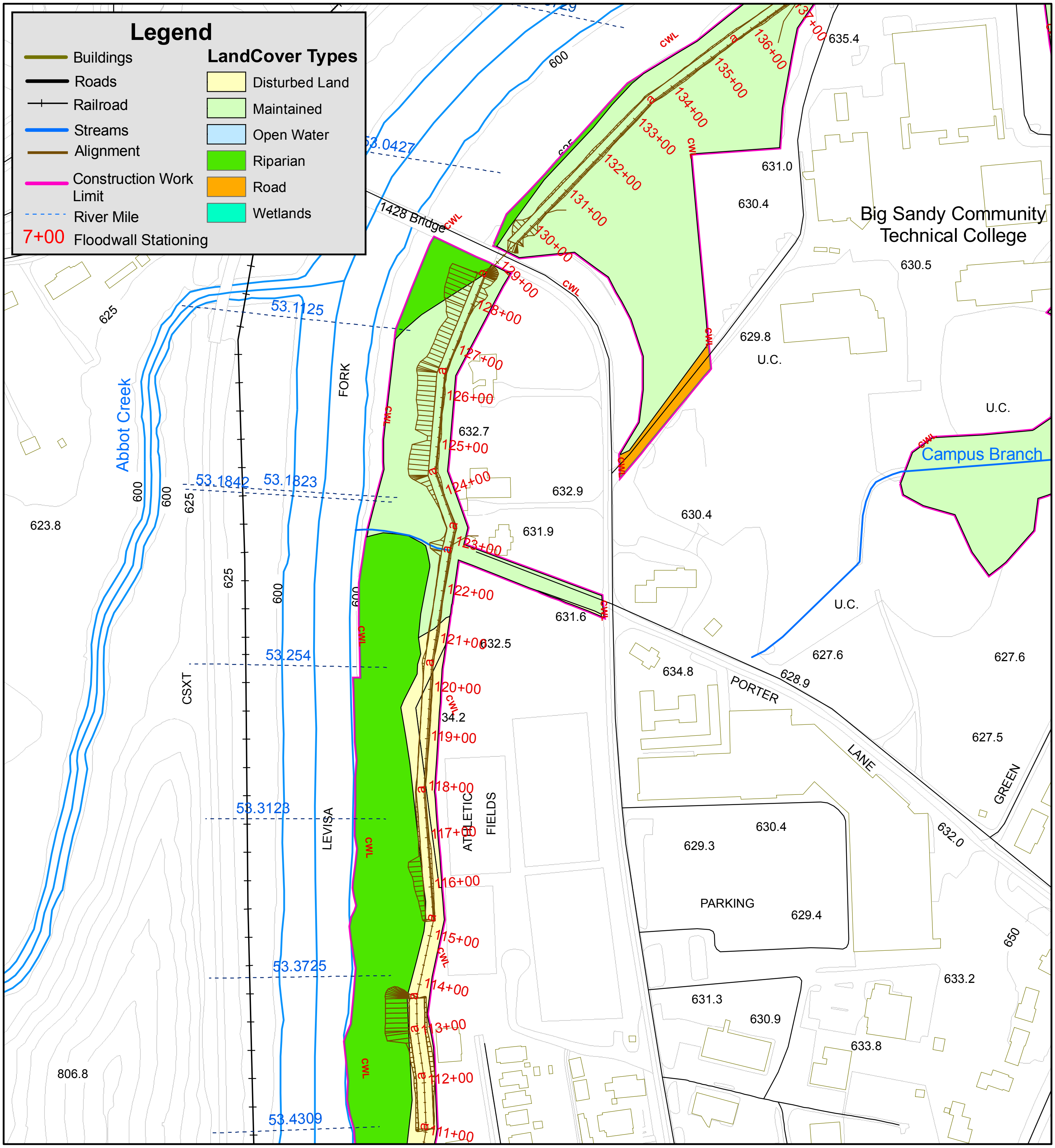
W:\USACE\Floyd-EIS\MXD\March2006\Fig5-7E_LU_LongWall.mxd Mar 12, 2006 DNB

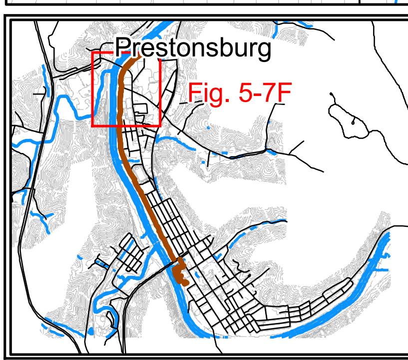
Figure

5-7E

amec

0 50 100 200 300 Feet





Land Cover Within The Construction Work Limits For Alternative Plan 2

Prestonsburg, KY

Notes

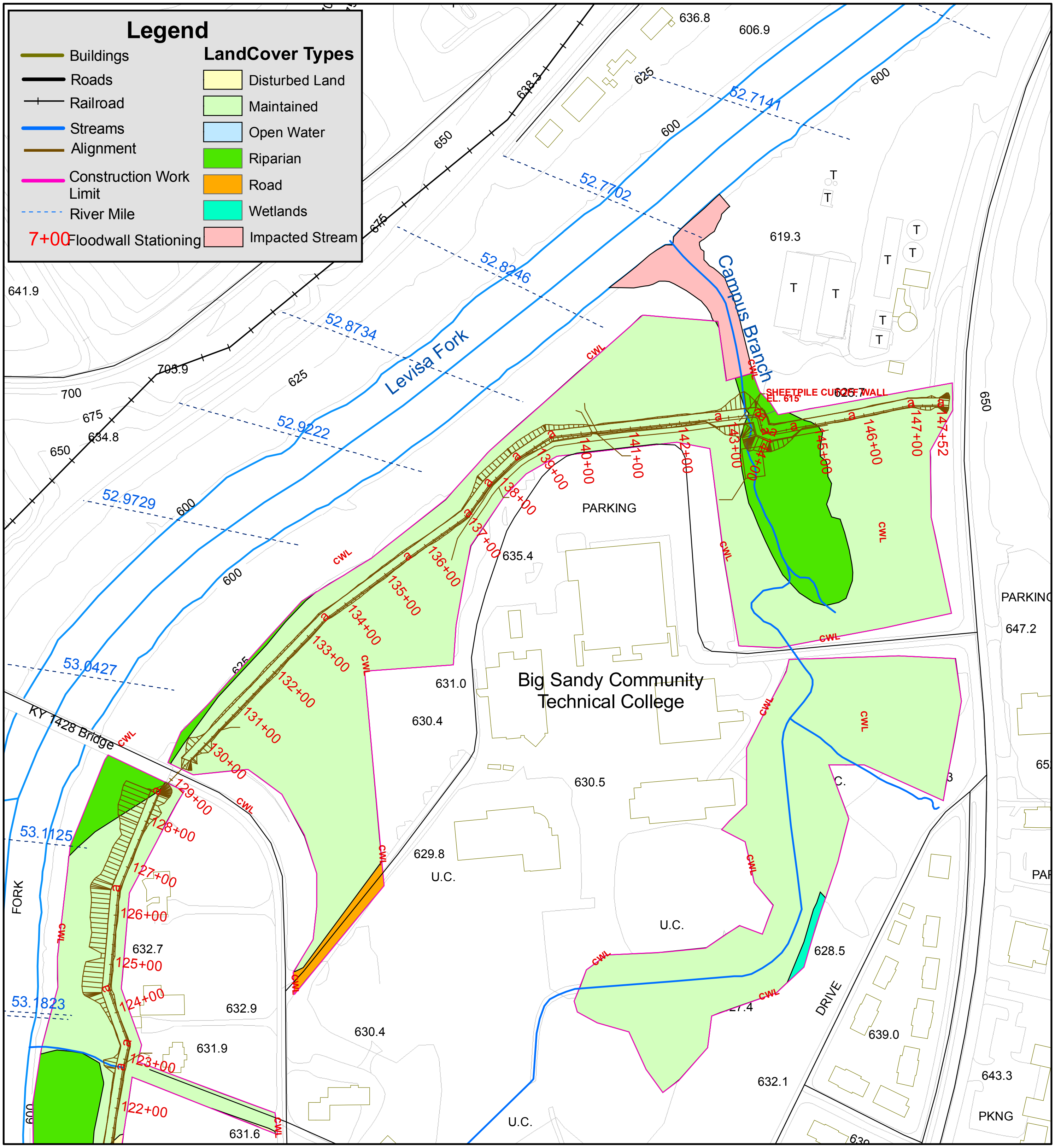
Figure

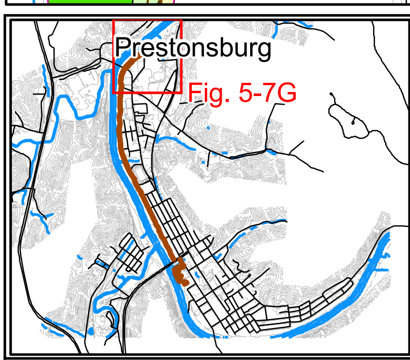
5-7F

Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig5-7F_LU_LongWall.mxd Mar 12, 2006 DNB

0 50100 200 300 Feet





Land Cover Within The Construction Work Limits For Alternative Plan 2

Prestonsburg, KY

Notes

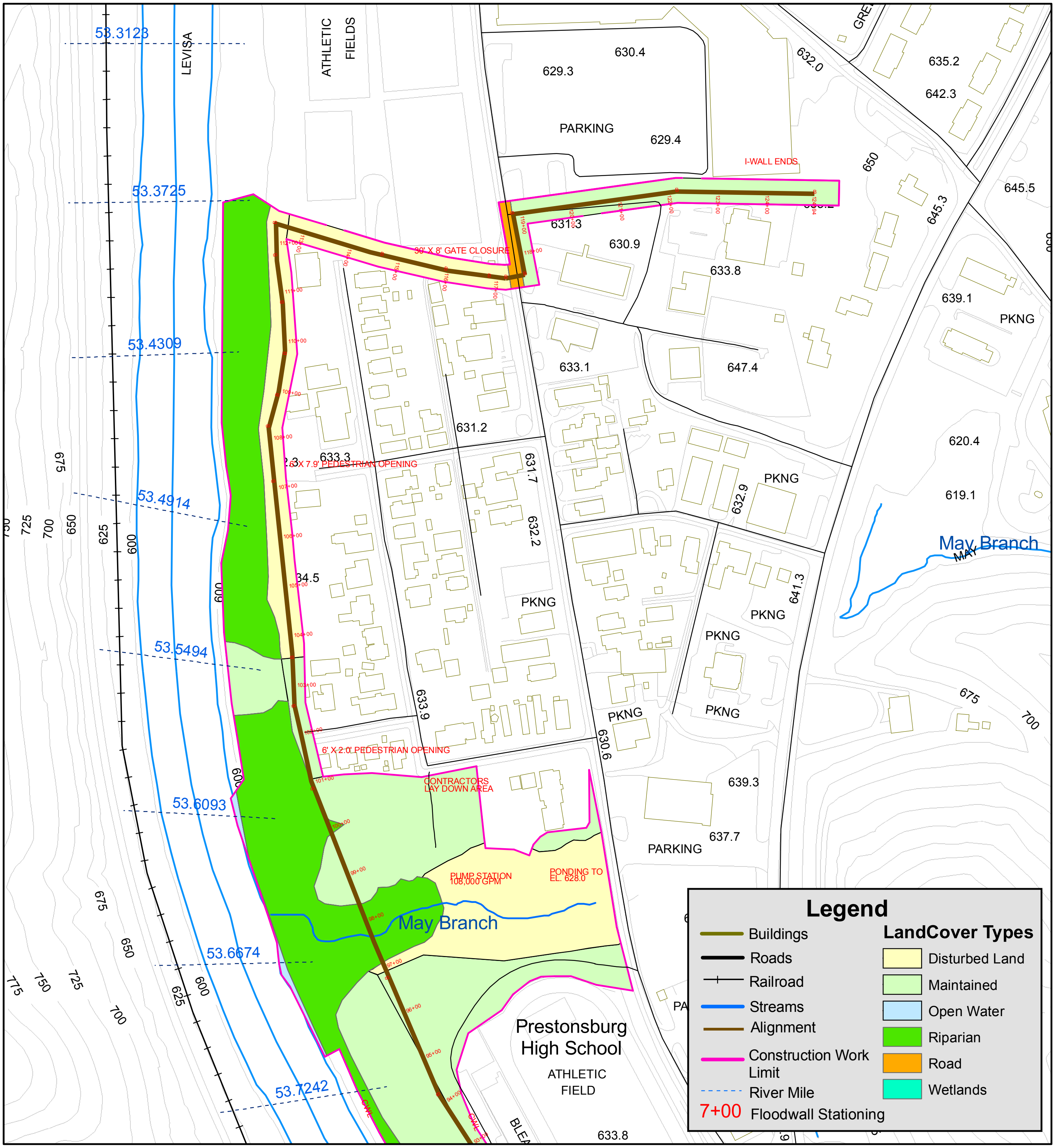
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

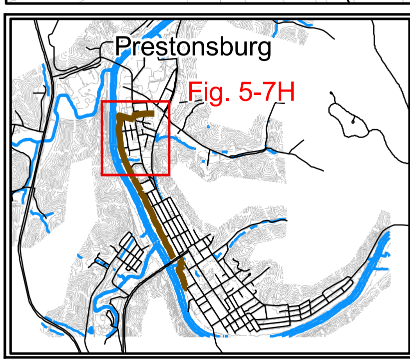
W:\USACE\Floyd-EIS\MXD\March2006\Fig5-7G_LU_LongWall.mxd Mar 12, 2006 DNB

Figure
5-7G

amec

0 50 100 200 300
Feet





Land Cover Within The Construction Work Limits For Alternative Plan 3

Prestonsburg, KY

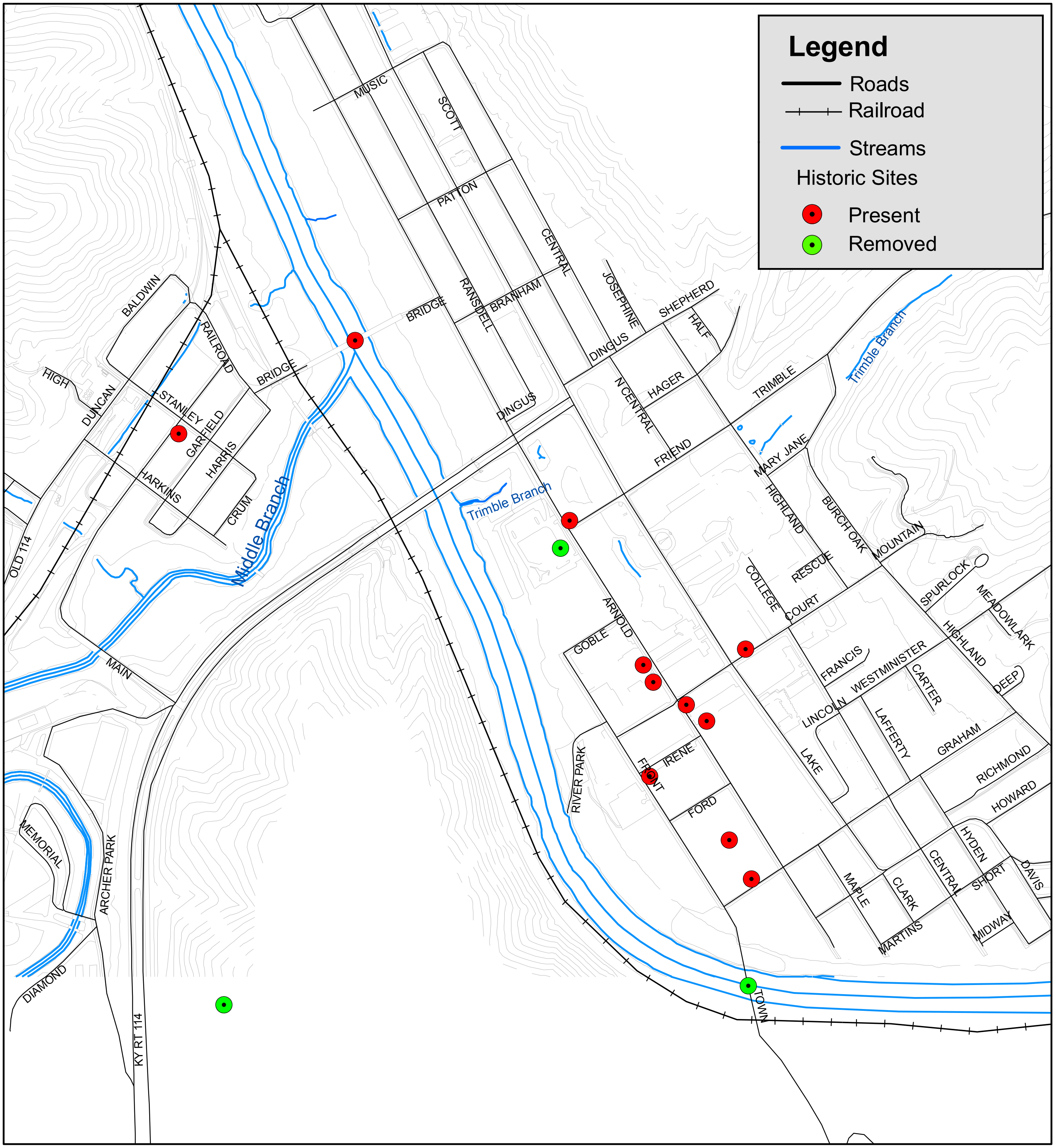
Notes

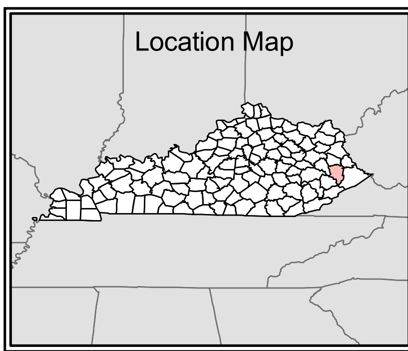
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig5-7H_LU_LongBlackBot.mxd Mar 12, 2006 DNB

Figure **5-7H**

0 50100 200 300 Feet





National Register of Historic Places

Prestonsburg, KY

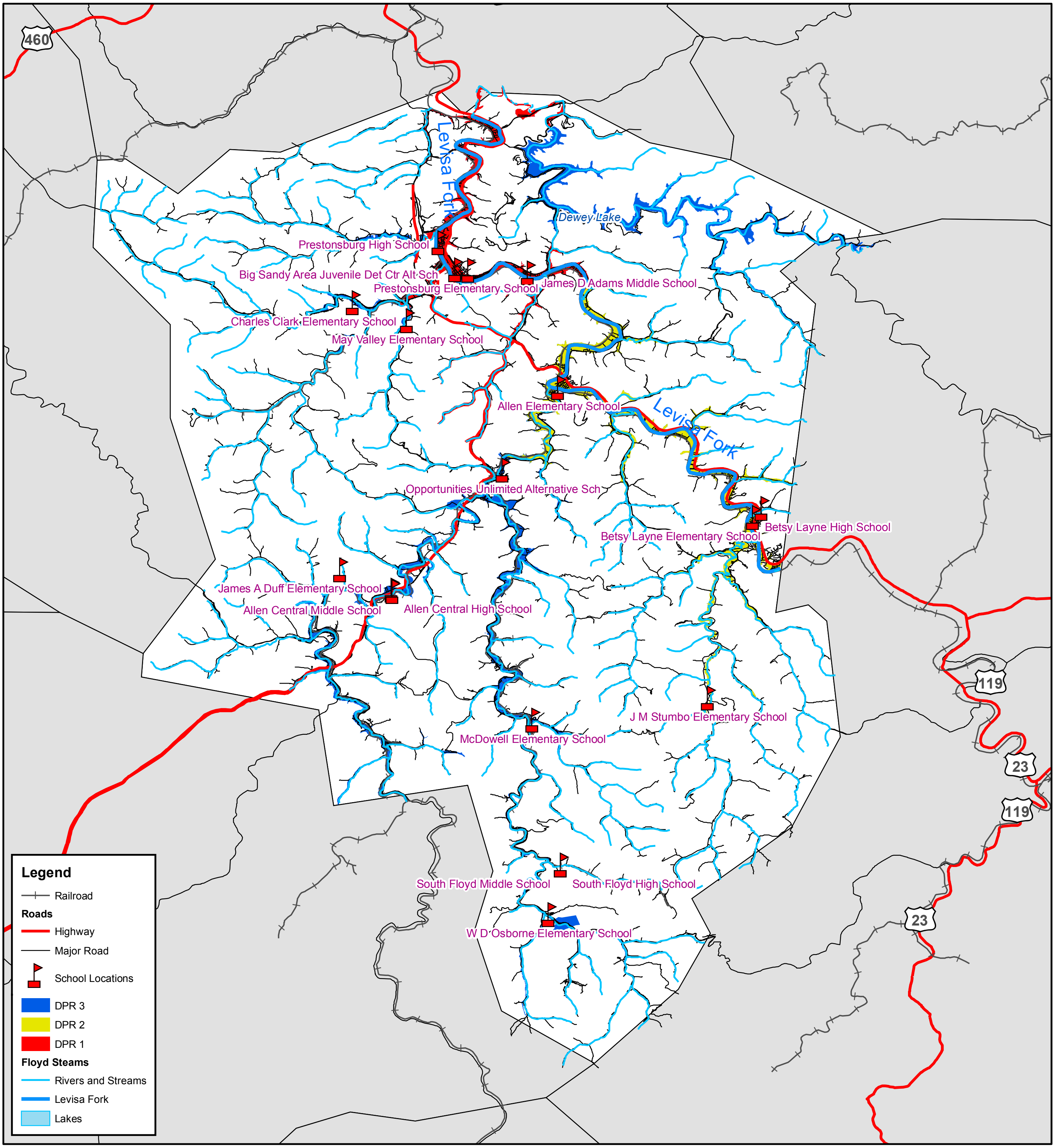
Notes

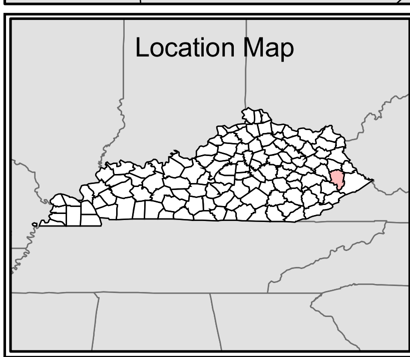
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig5-8_Historic.mxd Mar 12, 2006 DNB

Figure **5-8**

0 300 600 900 Feet





Floyd County School Locations

Floyd County, KY

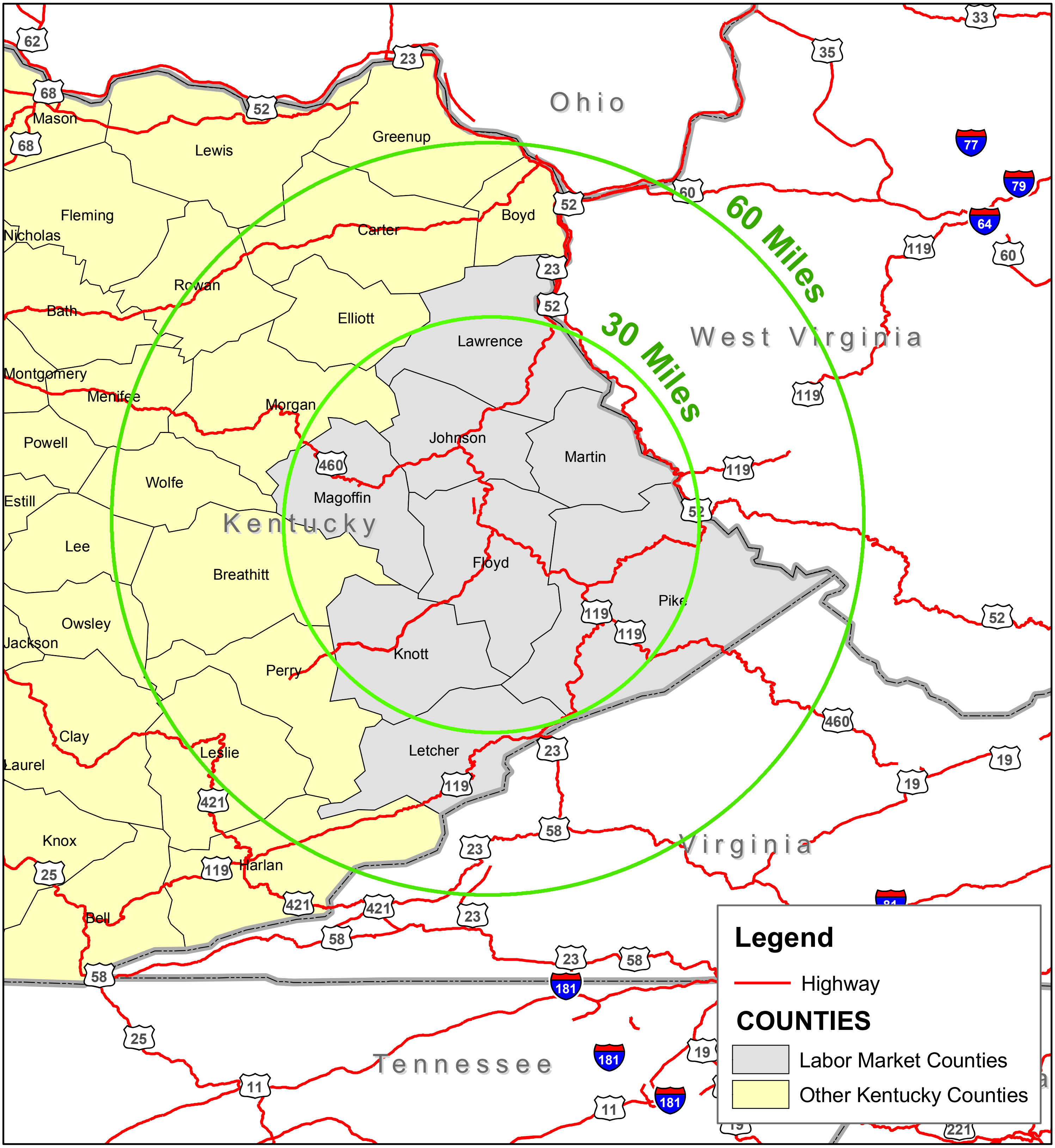
Notes

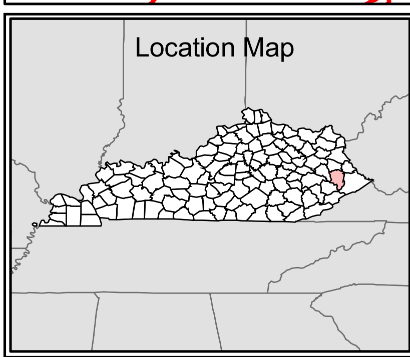
Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

Figure
5-9

0 1 2 4 6
Miles

W:\USACE\Floyd-EIS\MXD\March2006\Fig5-9_Schools.mxd Mar 12, 2006 DNB





Floyd County Labor Market

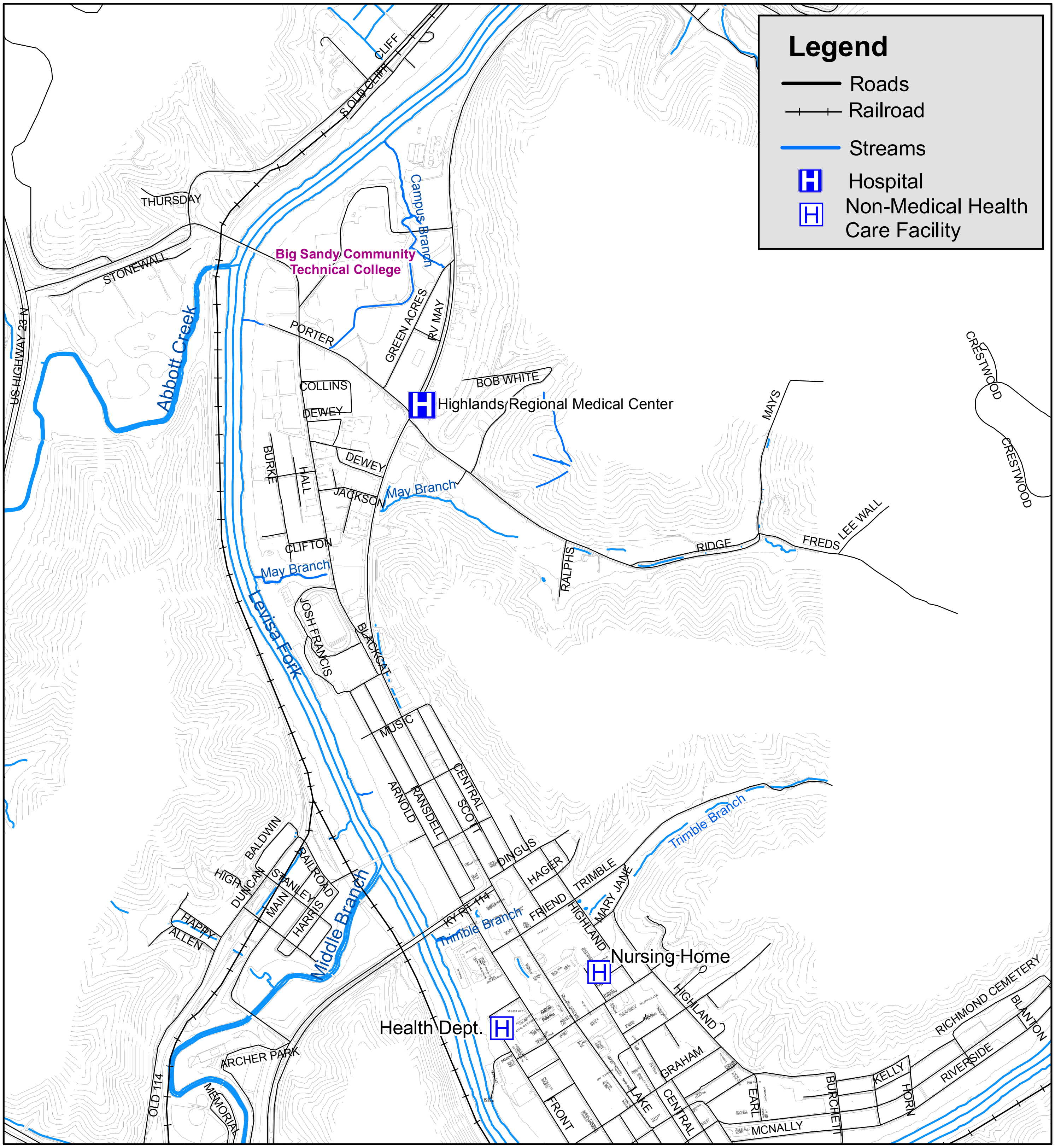
Notes

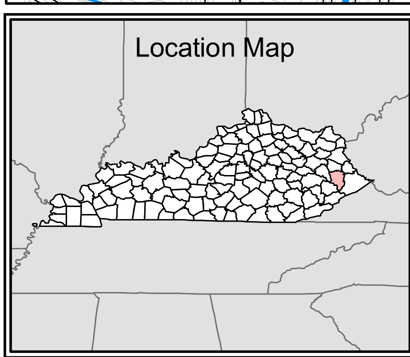
Figure **5-10**

Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig5-10_LaborMarket.mxd Mar 12, 2006 DNB

0 5 10 20 30 Miles





Hospital & Health Care Facilities

Prestonsburg, KY

Notes

Projection: Kentucky Stateplane - South, NAD 27, US foot
Imagery courtesy of USACE- Huntington District

W:\USACE\Floyd-EIS\MXD\March2006\Fig5-11_Health.mxd Mar 12, 2006 DNB

Figure

5-11

amec

0 500 1,000 1,500
Feet